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# LICHENS OF EASTERN LONG ISLAND, NEW YORK COLLECTED DURING THE 1986 ANDREWS FORAY

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The 1986 A. Leroy Andrews Foray met at the Peconic Dunes Camp on the North Fork of Long Island, New York, 19-21 September. The foray was organized by Bill Buck and Barbara Thiers. Joe Beitel led the group to a variety of habitats and provided much background information on the vegetation of Long Island. Long Island is one of the few areas in North America where the lichens have been extensively studied (Brodo, 1968).

During the foray we collected ca. 25% of the 261 species recorded by Brodo. In addition, five species not previously recorded were found, as well as some which were considered rare by Brodo. Three of the unrecorded species belong to the Caliciales and due to their small size it is no surprise that they have not previously been noted: Calicium parvum, Chaenotheca brunneola and Phaeocalicium polyporaeum. The others are Chrysothrix candelaris and Placynthiella oligotropha.

The foray collections also provide indications of the status of the Long Island lichens 20 years after Brodo's study. The recollection of a number of presumably pollution and desiccation sensitive Parmeliaceae considered more or less rare by Brodo (Cetraria fendleri, C. viridis, Foraminella subambigua, Platismatia tuckermanii and Tuckermanopsis americana), as well as Cladina stellaris, suggest that the lichens on the eastern end of Long Island have held their own. This reflects much credit on the various conservation efforts which have so far managed to preserve sufficient natural area close to a major city. In fact, Physcia stellaria and Xanthoria parietina were collected in the business district of Amagansett.

The vouchers for the records are those of Harris unless otherwise noted. The vouchers for collections by Harris, Buck and Anderson are at NY and those of Schmitt are in her personal herbarium. All localities are in Suffolk County.

CB: Cranberry Bog Nature Preserve, ca. 0.5 mi S of Riverhead, 40°54'N, 72°41'W; white cedar swamp.
DP: Dwarf Pine Barrens, ca. 0.5 mi S of junction of Sunrise Highway and Riverhead Road, 40°51'30"N, 72°39'W.
N: Napeague, ca. 2 mi E of Amagansett on Montauk Highway, 40°59'N, 72°06'W; dunes and swales N of railroad.
NWH: Northwest Harbor County Park, 41°00'N, 72°15'W; hardwoods.
PR: Peconic River County Park, headwaters of Peconic River, 40°54'N, 72°50'W; pine woods.

## Species List

*Bryoria furcellata* (Fr.) Brodo & Hawksw.--PR Schmitt).

*Buellia curtisii* (Tuck.) Imsh.--N.
*B. polyspora* (Willey in Tuck.) Vainio--DP.
*B. punctata* (Hoffm.) Massal.--CB, DP, N.
*B. stillingiana* J. Steiner--NWH.
*Calicium parvum* Tibell--PR, common on trunks of *Pinus rigida*, *Harris 19474*, new to Long Island. The range and habitat requirements of *C. parvum* are as yet unclear. Known in North America otherwise from Michigan and Ontario, it is an unexpected species for Long Island.
*Caloplaca citrina* (Hoffman) Th. Fr.--CB, on concrete drain.
*Candelariella aurella* (Hoffman) Zahlbr.--CB, on concrete drain.
*Cetraria arenaria* Kärnef.--DP (Anderson, Schmitt).
*C. fendleri* (Nyl.) Tuck--N, abundant on a small dead pine in shade. Brodo did not collect this species and cites only two collections by Roy Latham, one of which was collected at Napeague in 1947.
*C. viridis* Schweinitz--CB.
*Chaenotheca brunneola* (Ach.) Müll. Arg.--CB, on *Chamaecyparis*, *Buck 13929*, new to Long Island.
*Chrysothrix candelaris* (L.) Laundon--CB, on *Chamaecyparis*, *Harris 19415*, new to Long Island.
*Cladina stellaris* (Opiz) Brodo--N, Brodo cites only two contemporary records, one of which was at Napeague Beach, possibly part of the population we encountered.
*C. submitis* (Evans) Hale & Culb.--DP
*C. subtenuis* (des Abb.) Hale & Culb.--DP (Schmitt), N, NWH, PR.
*Cladonia atlantica* Evans--DP, PR.
*C. bacillaris* Nyl.--CB, N.
*C. beaumontii* (Tuck.) Vainio--CB.
*C. boryi* Tuck.--DP.
*C. brevis* Sandst.--DP.
*C. cristatella* Tuck.--CB (Schmitt).
*C. dimorphoclada* Robbins--DP, N.
*D. grayi* Merr. ex Sandst.--DP, N.
*C. incrassata* Flörke--CB.
*C. ochrochlora* Flörke--CB.
*C. parasitica* (Hoffman) Hoffman--PR.
*C. peziziformis* (With.) Laundon--CB (Anderson, Schmitt).
*C. rei* Schaerer--CB.
*C. strepsilis* (Ach.) Vainio--DP.
*C. uncialis* (L.) Wigg.--N.
*Diploschistes muscorum* (Scop.) R. Sant.--DP.
*Flavoparmelia caperata* (L.) Hale--CB, N, PR (Schmitt).
*Foraminella subambigua* (Gyelnik) Meyer--N. Brodo reported four collections of this as *Parmeliopsis ambigua* from which it is distinguished by producing pustular soralia.
*Hypocenomyce anthracophila* (Nyl.) James & G. Schneider--PR.
*H. scalaris* (Ach.) Choisy--CB, PR (Schmitt).
*Hypogymnia physodes* (L.) Nyl.--CB.
*Hypotrachyna livida* (Taylor) Hale--CB, PR.
*Lecanora caesiorubella* Ach. subsp. *prolifera* (Fink) Harris--N, NWH.
*L. dispersa* (Pers.) Sommerf.--CB, on concrete drain.
*L. strobilina* (Sprengel) Kieffer--N, NWH.
*Lecidea erratica* Körber--CB, DP.
*Lepraria* sp., atranorin and zeorin--CB. Treated by Brodo as *L. incana*, but that species contains divaricatic acid.
*Melanelia subaurifera* (Nyl.) Essl.--NWH, PR (Schmitt).
*Micarea chlorosticta* (Tuck.) Harris ined.--CB, on *Chamaecyparis*, *Buck 13927*. Brodo recorded only three collections as *Bacidia*. Although it has long,

several septate spores the ascus and chemistry (prasina unknown B) suggest placement in *Micarea* rather than *Scoliciosporum*. The combination will be made in the upcoming North American checklist.

*M. melaena* (Nyl.) Hedl.--PR.

*Parmelia squarrosa* Hale--CB.

*P. sulcata* Taylor--CB, DP, PR (Schmitt).

*Parmeliopsis aleurites* (Ach.) Nyl.--PR.

*P. placorodia* (Ach.) Nyl.--N, PR.

*Parmotrema hypoleucinum* (Stein) Hale--CB.

*P. hypotropum* (Nyl.) Hale--CB.

*P. perforatum* (Jacq.) Hale--CB, NWH.

*Pertusaria pustulata* (Ach.) Duby--CB, N, NWH.

*P. trachythallina* Erichs.--NWH.

*Phaeocalicium polyporaeum* (Nyl.) Tibell--Peconic Dunes Camp, on *Trichaptum biformis*, *Harris 19473*, new to Long Island.

*Phaeographis inusta* (Ach.) Müll. Arg.--Peconic Dunes Camp (Anderson). In Brodo as *P. dendritica*.

*Physcia adscendens* (Fr.) Oliv.--PR (Anderson)

*P. stellaris* (L.) Nyl.--Amagansett (Anderson)

*Placynthiella oligotropha* (Laundon) Coppins & James--CB, *Harris 19435*, new to Long Island.

*P. uliginosa* (Schrader) Coppins & James--N.

*Platismatia tuckermanii* (Oakes) Culb. & Culb.--CB, on *Chamaecyparis*, *Buck 13926*. Not collected by Brodo and known from only two older collections

*Punctelia rudecta* (Ach.) Krog--NWH.

*Pycnothelia papillaria* Dufour--DP.

*Pyrrhospora varians* (Ach.) R. C. Harris--N.

*Ramalina willeyi* Howe--N (Schmitt).

*Scoliciosporum chlorococcum* (Stenh.) Vezda--DP, N, PR.

*Trapelia involuta* (Taylor) Hertel--CB. In Brodo as *Lecidea coarctata*.

*Trapeliopsis flexuosa* (Fr.) Coppins & James--N.

*T. granulosa* (Hoffman) Lumbsch--DP.

*Tuckermanopsis americana* (Sprengel) Hale ined.--CB.

*T. ciliaris* (Ach.) Gyelnik--PR (Schmitt).

*Usnea strigosa* (Ach.) Eaton--NWH.

*Xanthoria parietina* (L.) Th. Fr.--Amagansett, parking lot.

Brodo, I. M. 1968. The lichens of Long Island, New York: a vegetational and floristic analysis. New York State Mus. Sci. Serv. Bull. 410: i-x, 1-330.

# ADDITIONAL SPECIES NOT RECORDED IN "THE LICHENS OF LONG ISLAND, NEW YORK"

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Five species were added to the lichens known to occur on Long Island, New York, in the previous paper. In the course of preparing a checklist of New York State lichens additional records have been found in both herbaria and on field trips. Also a number of species as treated by Brodo (1968) are now generally recognized to contain more than one element, or more recent studies have led to a shift in concept and name.

## Older Collections in BKL, CUP and NY

*Acarospora subfuscescens* (Nyl.) Magn.--Suffolk County: Orient, 1.VII.1917, *Latham s.n.* (NY). This species has only recently been recognized as occurring in North America (Royte et al., 1985).

*Candelariella efflorescens* Harris & Buck--Kings County: Brooklyn, 1862, [*Austin ?*] *79* (NY), as admixture in a collection of *Xanthoria fallax*.

*Conotrema urceolatum* (Ach.) Tuck.--Suffolk County: Sayville, 2.XII.1896, *F. E. Lloyd s.n.* (NY).

*Evernia prunastri* (L.) Ach.--Queens County: Astoria, 1842, collector unknown (BKL); Suffolk County: Greenport, 1853, collector unknown (BKL). This species is certainly extinct on Long Island and, in fact, I have seen no recent collections from New York, although it probably survives in the Adirondacks.

*Parmotrema crinitum* (Ach.) Choisy--Suffolk County: Orient, 1910, *Latham s.n.* (CUP).

*Peltigera didactyla* (With.) Laundon--Nassau County: Port Washington, II. 1865, collector unknown, ex hb. J. J. Crooke (NY). Reported by Brodo from Suffolk County only as *P. canina* var. *spuria*.

*Usnea rubicunda* Stirton--Kings County: Bath [Beach], [*Brainerd ?*] (BKL). Also apparently extinct on Long Island.

## Recent Collections (after 1975) in NY

*Chaenothecopsis subpusilla* (Vainio) Tibell--Suffolk County: Nissequogue River State Park, 13.VI.1975, *Buck B113*, det. L. Tibell.

*Endocarpon pusillum* Hedw.--Suffolk County: Peconic River County Park, E of Sandy Pond, on old mortar, 30.III.1980, *Harris 13246*.

*Usnea ceratina* Ach.--Suffolk County: Owl Pond, near Flanders, 10.VII.1976, *Dirig L273*.

## Species Subdivided since 1968

*Cladonia chlorophaea* (Flörke in Somm.) Spreng.--Brodo reported all specimens with grayanic acid except one with cryptochlorophaeic acid. Thus, the common species in this group is *C. grayi* Merr. ex Sandst. *Cladonia cryptochlorophaea* Asah. is rare as is *C. chlorophaea* s.str. which was not reported by Brodo. *Cladonia chlorophaea* s.str. may be reported from; Suffolk County: Hampton Bays State Park, 2.VIII.1960, *J. Fiore s.n.* (NY).

*Parmelia caperata* (L.) Ach.--This species is now divided into *Flavoparmelia caperata* (L.) Hale (sorediate, mostly corticolous) and *F. baltimorensis* (Gyelnik & Foriss) Hale (isidiate, mostly saxicolous). *Flavoparmelia caperata* predominates, but the Queens County, Cypress Hills and Richmond Hill collections by Hulst, 1890, cited by Brodo are *F. baltimorensis* as are three collections from Suffolk County in NY.

*Parmelia hypotropa* Nyl.--This species is now divided into *Parmotrema hypotropum* (Nyl.) Hale (norstictic acid) and *P. hypoleucinum* (Stein) Hale (stictic acid). They seem about equally common.

*Parmelia saxatilis* (L) Ach.--Presumably most of the material seen by Brodo is *P. squarrosa* Hale. However, *P. saxatilis* occurs as a maritime lichen further north and might well be found in similar habitats on Long Island. Brodo's vouchers require rechecking.

*Physcia orbicularis* (Neck.) Pötsch--This species is now placed in *Phaeophyscia* but *P. orbicularis* (Neck.) Moberg s.str. is extremely rare in the Northeast. The majority of Brodo's material is *Phaeophyscia rubropulchra* (Degel.) Essl. The specimens with a white medulla probably belong to *P. pusilloides* (Zahlbr.) Essl. There is a specimen of this in NY: Suffolk County: Greenport, VIII.1935, *Anderson s.n.*

## Species with Changed Concepts since 1968

*Cladonia calycantha* Nyl.--This is now considered a South American endemic. Long Island material is referavle to *C. rappii* var. *exilior* (des Abb.) Ahti (Ahti, 1983).

*Cladonia caroliniana* Tuck.--Material referred here by Brodo is *C. dimorphoclada* Robbins. *Cladonia caroliniana* is mainly southern and contains squamatic acid (Ahti, 1973).

*Lepraria* sp.--This is *L. finkii* (B. de Lesd. in Hue) R. C. Harris (Harris, 1985).

*Pertusaria tuberculifera* Nyl.--This species in a strict sense in tropical. Long Island specimens are *P. paratuberculifera* Dibben, typified with a Long Island specimen (Dibben, 1980).

Ahti, T. 1973. Taxonomic notes on some species of Cladonia subsect. Unciales Ann. Bot. Fennici 10: 163-184.

_____. 1983. Taxonomic notes on some American species of the lichen genus Cladonia. Ann. Bot. Fennici 20: 1-7.

Brodo, I. M. 1968. The lichens of Long Island, New York: a vegetational and floristic analysis. New York State Mus. Sci. Serv. Bull. 410: i-x, 1-330.

Dibben, M. J. 1980. The chemosystematics of the lichen genus Pertusaria in North America north of Mexico. Milwaukee Public Mus. Publ. Biol. 5: 1-162.

Harris, R. C. 1985. Lichens of the New Jersey pine barrens collected on the seventh A. Leroy Andrews Foray, 1982. Evansia 2: 44-47.

Royte, J., L. Brako & R. C. Harris. 1985. Two crustose lichens new to North America. Evansia 2: 10.

# A SPHAGNUM GROWTH MEDIUM

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The increasing interest in *Sphagnum* has made maintenance of cultures desireable for both teaching and research use. Unfortunately, surface sterilization is virtually mandatory prior to growing cultures on chemically defined media. Without elimination of contaminating fungi, algae and/or bacteria, rapid overgrowth of cultures regularly occurs. A need exists for a chemically defined medium which would support only the growth of the *Sphagnum* without surface sterilization.

A chemically defined medium, referred to as H-medium, was constructed by trial and error combinations of various concentrations of several nutrients and micronutrients. A three centimeter non-surface sterilized apical section of a *Sphagnum* was placed in a 22 mm x 175 mm screw cap glass tube. Three milliliters of the medium was added to the tube and placed 25 cm from two General Electric F40-PL Gro & Sho plant lights (providing a light intensity of 180 foot-candles) which were placed on a 12 hour light cycle. Rapid, contamination-free apical growth occurred for 12 weeks. Various species of *Sphagnum* grew at different rates with several species reaching a growth rate of 1 cm per week.

In a second test, the H-medium was solidified with 1.5% agar and a 3 cm non-surface sterilized apical section of *Sphagnum* was placed on the agar in a 15 mm x 100 mm glass petri dish. The specimens were moistened by periodic (as needed) additions of distilled water and placed under the same lighting conditions. Meristematic activity was more pronounced at the fascicles, each of which often gave rise to a new shoot with a growth rate of 0.1-0.5 cm per week. Growth again occurred with very little or no algal, bacterial or fungal contaminants.

Preliminary observations suggest that species of *Sphagnum* difficult to differentiate (e.g., *S. russowii* and *S. capillifolium*; *S. cuspidatum* and submerged *S. fallax*; *S. cuspidatum* and *S. trinitense*, etc.) may be readily identified by their differing growth rates and/or morphologies on the defined medium. The medium has not been tried with bryophyte species other than *Sphagnum*.

### H-medium

| | |
|---|---|
| Ammonium acetate ($NH_4C_2H_3O_2$) | 0.200 g |
| Calcium chloride ($CaCl_2$) | 0.010 g |
| Potassium chloride (KCl) | 0.030 g |
| Magnesium sulfate heptahydrate ($MgSO_4 \cdot 7H_2O$) | 0.100 g |
| Glycerophosphoric acid ($C_3H_9O_6P$) | 0.050 g |
| Thiamine hydrochloride (vitamin B-1) | 0.001 g |
| Tris | 0.333 g |
| Microelements (see below) | 1.000 mL |

### Microelements:

| | |
|---|---|
| Iron (III) chloride hexahydrate ($FeCl_3 \cdot 6H_2O$) | 2.420 g |
| Vitamin B-12 | 1.000 mg |
| Biotin | 1.000 mg |
| Boric acid ($H_3BO_3$) | 11.400 g |
| Manganese (II) sulfate monohydrate ($MnSO_4 \cdot H_2O$) | 1.230 g |
| Zinc sulfate heptahydrate ($ZnSO_4 \cdot 7H_2O$) | 0.220 g |
| Cobalt (II) sulfate heptahydrate ($CoSO_4 \cdot 7H_2O$) | 0.048 g |
| Disodium EDTA | 1.000 g |

Mix microelemental ingredient component first, bringing to 1.0 L with distilled water. Add $Na_2EDTA$ first. Then, dissolve each ingredient in approximately 25 mL of distilled water. Bring to 1.0 L, adding $CaCl_2$ last. Adjust the pH to 8.0 using 1.0N NaOH. Dispense. Autoclave 15 minutes at 110°C at 15 psi.

## TAXACOM (BUF), AN ELECTRONIC BULLETIN BOARD SYSTEM

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The Clinton Herbarium (BUF) offers collection-oriented botanists opportunity to communicate informally, sharing data-intensive textual information and computer programs in an online, symposium-style environment. TAXACOM is optimized for IBM-PC standard, MS-DOS software operating on an IBM-PC or IBM-PC compatible microcomputer. It is intended as an alternative to the monolithic databank, and bryological-lichenological contributions are especially encouraged.

Present and projected features include: a Message section, public or private; several Conferences on various topics; Flora Online, an electronic journal for formal, scientific works; a Latin translation service; positions available/wanted; bulletins for society meetings and notices; computer programs: herbarium management, data manipulation, keys to taxa, numeric taxonomy; species lists (checklists, synonymy, type specimens, specialized collection inventories); bibliographies; specialized glossaries and dictionaries; descriptions of herbaria; comments and controversy, including requests for help, lively debate; reviews of electronic publications; and reports of symposia and field trips.

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# THE BRYOPHYTES OF THE NEW YORK BOTANICAL GARDEN FOREST

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The New York Botanical Garden Forest (formerly known as the "Hemlock Forest") may not seem a likely habitat for a rich bryoflora, but a somewhat surprising number of species have been collected. This 40 acre urban forest in the borough of the Bronx in New York City, consisting of rocky cliffs, ephemeral streams and a mixed hardwood-coniferous forest, borders the Bronx River. A shrub-herbaceous layer is generally lacking throughout a major portion of the wooded area. The purpose of this project is to determine what bryophyte species exist within this inner city area.

Twenty-five collecting days were used in a sampling period between October 1, 1985 and August 5, 1986. Sampling was random, but the entire designated forest was thoroughly searched. Over 200 bryophytes were collected and are deposited at The New York Botanical Garden (NY). A total of 49 moss and 5 hepatic species were identified.

Collections were numbered using the NYBG Forest Project Grid System. Nomenclature generally follows Crum & Anderson (1980) and Stotler & Crandall-Stotler (1977). The list of species collected includes a brief description of habitat data. Species abundance is noted (Abundant = over 10 sitings or collections; Common = over 5 collections; Occasional = 2-5 collections; Rare = 1 collection).

A list of New York Botanical Garden bryophytes, collected in 1898 by Elizabeth G. Britton and Marshall A. Howe, is included to give a general idea of what had been in the forest at that time. The Hepaticae and Anthocerotae were collected and determined by M. A. Howe (1899) and the Musci were collected and determined by E. G. Britton (1899). It should be noted that this list included collections from throughout the entire Garden and the extensiveness of collecting is not known. "Hemlock Forest" is inscribed on many, but not all, of the collection labels.

A number of changes can be noted with the bryophyte flora when comparing the present list to the 1899 one. This does not seem surprising considering increased human impact. Future studies could be done to assess the effects of tranmpling and pollution on this habitat.

At present, the dominant species of The Forest are Atrichum angustatum, Ceratodon purpureus, Dicranella heteromalla, Isopterygium elegans, Plagiomnium cuspidatum, Pohlia nutans and Polytrichum commune. Six of these seven mosses were noted by Elizabeth Britton in the 1898 New York Botanical Garden survey.

## Mosses

*Amblystegium juratzkanum* Schimp.--occasional; on river bank, on stones.
*A. serpens* (Hedw.) B.S.G.--rare; on stone wall.
*A. varium* (Hedw.) Lindb.--common; on stones, river bank, tree bases.
*Anomodon rostratus* (Hedw.) Schimp.--rare; on soil.
*Aphanorrhegma serratum* (Hook. & Wils. ex Drumm.) Sull.--occasional, localized; on river bank.
*Atrichum angustatum* (Brid.) B.S.G.--abundant; on soil, rocky areas.
*A. crispum* (James) Sull.--occasional; on soil, rock ledges.
*Barbula unguiculata* Hedw.--occasional; on stones.
*Brachythecium oxycladon* (Brid.) Jaeg.--occasional; on rock steps, stone wall, soil.
*B. plumosum* (Hedw.) B.S.G.--occasional, localized; on rocks in stream.
*B. rutabulum* (Hedw.) B.S.G.--occasional; on rocks, soil.

*Bryum argenteum* Hedw.--abundant; on stones.
*B. caespiticium* Hedw.--occasional; on stone wall.
*Callicladium haldanianum* (Grev.) Crum--rare; on soil.
*Campylium hispidulum* (Brid.) Mitt.--rare; on stone wall.
*Ceratodon purpureus* (Hedw.) Brid.--abundant; on rocks, soil.
*Dicranella heteromalla* (Hedw.) Schimp.--abundant; on soil, rocks, tree bases, rock crevices.
*Dicranum montanum* Hedw.--occasional; mostly on tree bark, occasionally on wooden fences.
*Ditrichum lineare* (Sw.) Lindb.--occasional; on soil.
*D. pallidum* (Hedw.) Hampe--rare; on soil.
*D. pusillum* (Hedw.) Hampe--occasional; on soil.
*Entodon cladorrhizans* (Hedw.) C. Müll.--occasional; on fallen trees, decaying tree stumps.
*Eurhynchium riparioides* (Hedw.) Rich.--rare, localized; splash zone of waterfall.
*Fissidens bryoides* Hedw.--occasional, localized; on rock along river edge (mostly submerged).
*F. bushii* (Card. & Thér.) Card. & Thér.--rare; on soil.
*F. fontanus* (B. Pyl.) Steud.--rare; submerged in river.
*Homomallium adnatum* (Hedw.) Broth.--occasional; on tree bark.
*Hygroamblystegium tenax* (Hedw.) C. Jens.--rare; cliff beside river.
*Hypnum cupressiforme* Hedw.--rare; on cliff.
*H. pallescens* (Hedw.) P. Beauv.--occasional; on tree bark.
*Isopterygium elegans* (Brid.) Lindb.--abundant; on rock, soil.
*Leptodictyum riparium* (Hedw.) Warnst.--occasional, localized; submerged in river.
*Leskea gracilescens* Hedw.--rare; on tree bark.
*Leucobryum albidum* (Brid.) Lindb.--abundant; on soil, rock, tree stumps.
*Mnium hornum* Hedw.--rare; flood zone of river.
*Plagiomnium cuspidatum* (Hedw.) Kop.--abundant; on soil, rock, tree bases.
*Platygyrium repens* (Brid.) B.S.G.--occasional; on tree bark, tree roots.
*Pogonatum pensilvanicum* (Hedw.) P. Beauv.--rare; on clay soil.
*Pohlia nutans* (Hedw.) Lindb.--abundant; on soil, rock, tree bases.
*Polytrichum commune* Hedw.--abundant; on soil, rocky areas.
*P. ohioense* Ren. & Card.--abundant; on soil, rocky areas.
*Pylaisiella polyantha* (Hedw.) Grout--occasional, localized; on stone walls.
*Schistidium alpicola* (Hedw.) Limpr.--occasional; on stone fence and steps.
*S. apocarpum* (Hedw.) B.S.G.--rare; on stone fence.
*Rhizomnium punctatum* (Hedw.) Kop.--rare, localized; submerged in stream.
*Tetraphis pellucida* Hedw.--occasional; on decaying trees, tree bark.
*Tortella humilis* (Hedw.) Jenn.--rare; on soil, rock.
*Tortula muralis* Hedw.--rare; on stone wall.
*Weissia controversa* Hedw.--occasional; on stone wall.

## Hepatics

*Calypogeia muelleriana* (Schiffn.) K. Müll.--rare; on rocky area.
*Gymnocolea inflata* (Huds.) Dum.--rare; on rock.
*Lophocolea heterophylla* (Schrad.) Dum.--occasional; on decaying tree stumps, tree bark.
*Marchantia polymorpha* L.--occasional, localized; along river bank.
*Pallavicinia lyellii* (Hook.) Carruth.--rare; on decaying tree stump.

# Checklist of bryophytes of The New York Botanical Garden
## - Collections of 1898 and 1986 -

| | 1898* | 1986 |
|---|---|---|
| *Amblystegium juratzkanum* | | X |
| *A. serpens* | | X |
| *A. varium* | | X |
| *Anomodon attenuatus* | X | |
| *A. rostratus* | | X |
| *Aphanorrhegma serratum* | | X |
| *atrichum angustatum* | X | X |
| *A. crispum* | | X |
| *Barbula unguiculata* | X | X |
| *Brachythecium oxycladon* | X | X |
| *B. plumosum* | X | X |
| *B. rutabulum* | | X |
| *Bryoandersonia illecebra* | X | |
| *Bryum argenteum* | X | X |
| *B. caespiticium* | X | X |
| *Buxbaumia aphylla* | X | |
| *Callicladium haldanianum* | X | X |
| *Campylium hispidulum* | | X |
| *Ceratodon purpureus* | X | X |
| *Climacium americanum* | X | |
| *Ctenidium molluscum* | X | |
| *Dicranella heteromalla* | X | X |
| *Dicranum montanum* | | X |
| *D. scoparium* | X | |
| *Diphyscium foliosum* | X | |
| *Ditrichum lineare* | X** | X |
| *D. pallidum* | X** | X |
| *D. pusillum* | | X |
| *D. pusillum* var. *tortile* | X | |
| *Entodon cladorrhizans* | | X |
| *Eurhynchium riparioides* | | X |
| *Fissidens bryoides* | | X |
| *F. bushii* | | X |
| *F. fontanus* | | X |
| *F. taxifolius* | X | |
| *Funaria hygrometrica* | X | |
| *Hedwigia ciliata* | X | |
| *Helodium paludosum* | X | |
| *Homomallium adnatum* | | X |
| *Hygroamblystegium tenax* | | X |
| *Hypnum cupressiforme* | | X |
| *H. pallescens* | | X |
| *Isopterygium elegans* | X | X |
| *Leptobryum pyriforme* | X | |
| *Leptodictyon riparium* | | X |
| *Leskea gracilescens* | | X |
| *L. obscura* | X | |
| *Leucobryum albidum* | X** | X |
| *L. glaucum* | X | |
| *Mnium hornum* | | X |
| *Orthotrichum ohioense* | X | |

| | 1898* | 1986 |
|---|---|---|
| *Physcomitrium pyriforme* | X | |
| *Plagiomnium cuspidatum* | X | X |
| *Plagiothecium denticulatum* | X | |
| *Platygyrium repens* | | X |
| *Pogonatum pensilvanicum* | X | X |
| *Pohlia nutans* | | X |
| *Polytrichum commune* | X | X |
| *P. ohioense* | X | X |
| *P. piliferum* | X | |
| *Ptychomitrium incurvum* | X | |
| *Pylaisiella polyantha* | X | |
| *Rhizomnium punctatum* | X | X |
| *Schistidium alpicola* | | X |
| *S. apocarpum* | | X |
| *Sematophyllum adnatum* | X | |
| *Tetraphis pellucida* | | X |
| *Toretlla humilis* | | X |
| *Tortula muralis* | | X |
| *Ulota hutchinsiae* | X | |
| *Weissia controversa* | | X |
| | | |
| *Bazzania trilobata* | X | |
| *Calypogeia muelleriana* | | X |
| *Cephalozia catenulata* | X | |
| *C. connivens* | X | |
| *C. lunifolia* | X | |
| *Cololejeunea biddlecomiae* | X | |
| *Frullania eboracensis* | X | |
| *Gymnocolea inflata* | | X |
| *Lophocolea heterophylla* | | X |
| *Marchantia polymorpha* | | X |
| *Odontoschisma sphagni* | X | |
| *Pallavicinia lyellii* | | X |
| *Riccia sullivantii* | X | |
| | | |
| *Notothylas orbicularis* | X | |
| *Phaeoceros laevis* | X | |

---

*names updated

** additional NYBG - E. G. Britton collections, located in herbarium but not included in 1899 list.

I would like to thank Chuck Nieder, William Buck, Barbara Thiers, William Steere, Mark McDonnell, Steven Churchill, Inés Sastre-De Jesús, Nick Popovich and Ellen Diane Bloch. Thanks are also extended to Dr. E. H. Ketchledge who introduced me to the study of bryophytes.

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Stotler, R. & B. Crandall-Stotler. 1977. A checklist of the liverworts and hornworts of North America. Bryologist 80: 405-428.

# RECENT DISCOVERIES IN THE NEW YORK STATE BRYOFLORA

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The first enumeration of the moss and hepatic floras of New York State was published in 1866 in the 19th Annual Report of the Regents of the University of the State of New York, Albany. However, in spite of this long history of bryological study, additions to the most recent checklist of mosses of the state (Ketchledge, 1980) continue to be made. During the summer of 1986 I collected several species that are noteworthy because they are rare in the eastern United States or evidently have not been recognized before as growing in New York.

Unless otherwise credited, the general distributional data used below are from Crum & Anderson (1981).

## 1. *Cinclidium stygium*

This moss, a species of rich fens (i.e., peat accumulating wetlands with calcareous groundwater), had been overlooked in New York until its discovery in the Bergen-Byron Swamp, Genesee County (Miller, 1971). Two new stations can now be added to the western New York locality.

Herkimer County: Hidden Lake "marsh," Town of Litchfield, with *Drepanocladus revolvens*, *Scorpidium scorpioides*, and *Moerckia hibernica*, beneath sedges in an open fen, *Miller 9411* (NYS). Warren County: west end of Glen Lake, ca. 5 km NW of Glens Falls, with *Plagiomnium ellipticum* in a wet hollow, beneath shrubs in wooded part of fen, *Miller 9212* (NYS).

These records extend the known distribution of the species to eastern New York. Cinclidium stygium Sw. should be sought in wetlands elsewhere in the state, particularly in regions where calcareous bedrock or glacial till is prominent. The three New York stations are the southernmost known in eastern North America (see Mogensen, 1973).

## 2. A Note on Habitat of *Telaranea nematodes* on Long Island

Participants in the 1986 A. L. Andrews Foray visited a boggy, freshwater wetland north of Sweezy Pond near Riverhead, Long Island, where a large population of the hepatic Telaranea nematodes (Gott. ex Aust.) Howe was first noticed by Norman Trigoboff. The plant's long, filamentous leaves and flattened habit make this species immediately recognizable. Long Island (and nearby Fisher's Island) lie at the northern known limit of the species' range in the New World. Otherwise, Telaranea nematodes occurs southward on the Atlantic and Gulf coastal plains and in the West Indies and northern South America; it is also present in Africa and oceanic parts of Europe.

Only a few collections of Telaranea have been made on Long Island. I have seen the following.

Suffolk County: Nepeague, *Latham 34181* (NYS); Hither Hills State Park, *Schuster 22074* (NY). Richmond County: Arlington, Staten Island, 28 Nov 1903, *Horne s.n.* (NY). Schuster (1969) cited a collection from Freeport, Long Island, which is in Nassau County.

Data for the Andrews Foray collection are: Suffolk County: edge of boggy wetland with standing water, E of Cedar Pond and N of Sweezy Pond, ca. 1.5 km SW of Riverhead center, *Miller 9484* (NYS).

At the Riverhead locality *Telaranea* grew over plant leaf and stem debris in association with *Cephalozia macrostachya*, *Lophozia capitata*, *Sphagnum auriculatum*, *Polygala cruciata* and various Cyperaceae. High water extending landward from an adjacent pond had recently covered the site, which was sedge dominated. Schuster (1969) reported that the species preferred strongly shaded conditions. On Long Island, however, the plants appear to grow mostly in open habitats, not those dominated by trees and shrubs. Moist peatly soil, moist sand, or plant litter were the usual substrata, suggesting that *Telaranea* may behave more as a pioneer at the northern limit of its range than it does in the southeastern United States.

### 3. Additions to the Ketchledge Checklist of New York State Mosses

Collections I made in Genesee, Herkimer and Jefferson counties have added four new mosses to the 463 species of Sphagnidae, Andreaeidae and Bryidae listed by Ketchledge (1980). Two of these, *Ditrichum flexicaule* and *Brachythecium turgidum*, came from a poorly explored area of alvar vegetation in Jefferson County where fissured limestone bedrock is at or near the surface and shallow soils support only a sparse tree cover. The New York State alvar area is of special interest because poor drainage or a high water table has produced small wetland areas that support a more mesic moss flora than would otherwise be expected in a xeric, limestone habitat.

The species added to the New York State flora are the following:

*Distichium inclinatum (Hedw.) B.S.G.*--Genesee County: Bergen-Byron Swamp, ca. 4 km NE of Byron, side of rotting stump, wet area beneath *Thuja*, *Miller 9448* (NYS; leaves encrusted with calcium carbonate); on twig, open carr, *Miller 9450* (NYS). Plants in both collections bore inclined capsules typical of the species. I reported *D. capillaceum* from the Bergen-Byron Swamp (Miller, 1971), but the specimen may be *D. inclinatum*. Unfortunately, it does not included mature sporophytes, and distinctions between gametophytes of the two species are unclear. However, *D. capillaceum* is not unexpected in a *Thuja* swamp because this moss occurs in similar habitats in northern Michigan. The nearest stations for *D. inclinatum*, a boreal and western species, are in Newfoundland, Ontario (Bruce Peninsula) and Michigan (Straits of Mackinac region).

*Ditrichum flexicaule* (Schwaegr.) Hampe--Jefferson County: alvar ca. 5 km N of Dexter, in cushions in wet area over limestone, *Miller 9467* (NYS); alvar 4 km NE of Chaumont, in cushions over limestone, *Miller 9471* (NYS). The nearest reported locality for this boreal and arctic moss is in Vermont; otherwise the species is at its southern distributional limit in Ontario and northern Michigan (and in Iowa as a disjunct).

*Rhizomnium pseudopunctatum* (Bruch & Schimp.) Kop.--Genesee County: Bergen-Byron Swamp, ca. 4 km NE of Byron, with sedges, wooded part of rich fen, *Miller 9445* (NYS); with *Lophozia rutheana* at edge of marl "room," *Miller 9446* (NYS). Herkimer County: Hidden Lake "marsh," Town of Litchfield, wet floor of *Thuja* swamp, *Miller 9410* (NYS); Mud Lake, 5 km SSW of Jordanville, wet floor of *Thuja* swamp beneath *Larix*, *Miller 9415* (NYS). The new stations are within the expected range of this boreal moss. Otherwise the species is known from Maine, Michigan and Minnesota, which marks the southern limit of its range in eastern North America.

*Brachythecium turgidum* (C. J. Hartm.) Kindb.--Jefferson County: alvar ca. 5 km N of Dexter, in loose wefts with other mosses, shallow wet fen on limestone pavement, *Miller 9463*, *9468* (NYS). Evidently not otherwise reported from the northeastern United States, although collections of it have been made in northern Michigan, Ontario, Quebec and Nova Scotia.

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## THIRD ANNUAL BLOMQUIST BRYOLOGICAL FORAY

The Blomquist Bryological Foray for 1987 is being organized by Brent Mishler (Department of Botany, Duke University, Durham, NC 27706) and Marie Hicks (Department of Biology, Appalachian State University, Boone, NC 28608). The foray this year will stay in Fontana Village, a community built in the 1940's to house workers during the construction of Fontana Dam. This hydroelectric project was to provide electricity for Oak Ridge, Tennessee, where the atomic bomb was being developed during World War II. It has since been operated as a resort.

The area is surrounded by the Nantahala National Forest; the Joyce Kilmer Memorial Forest and the Joyce Kilmer/Slickrock Wilderness Area are nearby. Exploration will be in coves in Great Smoky Mountains National Park and the Joyce Kilmer Memorial Forest, the only remaining virgin hardwood forest in the eastern United States.

For further information and reservations, please contact Dr. Mishler or Dr. Hicks as soon as possible.

## WILLAMETTE VALLEY NATURE CALENDAR

David H. Wagner (P.O. Box 30064, Eugene, OR 97403), has issued his 1987 version of a nature calendar. Of special interest to bryologists and lichenologists is the inclusion of the moss/liverwort/lichen of the month. Each month has a real specimen of one of these plants glued in, with the scientific and common names, as well as distinguishing characteristics and natural history. Although he has sold out for this year, he is interested in having others prepare similar products to popularize mosses etc. Contact him for more information, or to be put on the list for next year's calendar.

# ADDITIONS TO THE MOSS FLORA OF ONTARIO AND QUEBEC

Robert R. Ireland
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National Museums of Canada
Ottawa, Ontario K1A 0M8

Collecting in Ontario and Quebec by myself and others has resulted in the addition of 13 taxa previously unreported from the two provinces. Seven species are new to Ontario while five species and one variety are new to Quebec according to the checklist of Ireland et al. (1980). The distribution following each taxon is that in the checklist unless otherwise stated. Voucher specimens are deposited in the National Herbarium of Canada (CANM) in Ottawa.

## New to Ontario

*Bryum knowltonii* Barnes--Kenora Dist.: 0.25 km from SW coast of Hudson Bay, 8 km NW of Winisk, 55°23'N, 85°22'W, *Sims 5137*. Det. H. Ochi. Reported from Saskatchewan, Quebec, Labrador, Newfoundland, Nova Scotia and Arctic Archipelago.

*Bryum purpurascens* (R. Br.) B.S.G.--Kenora Dist.: coast of Hudson Bay, immediately E of mouth of Shagamu River, 55°52'N, 86°46'W, *Riley 7487*. Reported from Alberta, Quebec, Labrador, Newfoundland and Arctic Archipelago.

*Dicranella crispa* (Hedw.) Schimp.--Thunder Bay Dist.: Lake Nipigon, Little Jackfish River just above North Ombabika Bay, 50°16'N, 88°24'W, *Garton 22260*. Reported from British Columbia, Alberta, Manitoba, Quebec, Labrador, New Brunswick, Yukon Territory, Northwest Territories and Arctic Archipelago.

*Dicranum brevifolium* (Lindb.) Lindb.--Algoma Dist.: Gros Cap, ca. 16 km W of Sault Ste. Marie, 46°32'N, 84°35'W, *Ireland 14807*; Kenora Dist.: SW coast of Hudson Bay, ca. 2 km NE of Sutton River mouth, 55°16'N, 83°41'W, *Sims 5276*. Reported (as *D. muehlenbeckii* var. *cirratum* (Schimp.) Lindb.) from British Columbia, Alberta, Quebec, Yukon Territory and Arctic Archipelago.

*Seligeria brevifolia* (Lindb.) Lindb.--Grey Co.: Inglis Falls, along Bruce Trail beside Sydenham River, just S of Owen Sound, ca. 44°34'N, 80°56'W, *Ireland 20245*. Reported from Newfoundland and New Brunswick.

*Splachnum vasculosum* Hedw.--Kenora Dist.: SW coast of Hudson Bay, just E of Sutton River mouth, ca. 1 km from coast, 55°15'N, 83°40'W, *Sims 5299*. Reported from British Columbia, Alberta, Manitoba, Quebec, Labrador, Newfoundland, Yukon Territory, Northwest Territories and Arctic Archipelago.

*Tayloria serrata* (Hedw.) B.S.G.--Thunder Bay Dist.: Lake Nipigon, channel opposite St. Paul Island, on mainland on N peninsula at N end of McIntyre Bay, 48°39'N, 88°37'W, *Garton 21274*. Reported from British Columbia, Alberta, Quebec, Labrador, Newfoundland, New Brunswick, Nova Scotia, Northwest Territories and Arctic Archipelago.

## New to Quebec

*Aloina brevirostris* (Hook. & Grev.) Kindb.--La Grande Riviere de la Baleine, along river ca. 9 km E of town, 55°16'N, 77°38'W, *Ireland & Argus 21491*. Reported from British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Nova Scotia, Yukon Territory, Northwest Territories and Arctic Archipelago.

*Brachythecium nelsonii* Grout--Lac Guillaume-Delisle, University of Laval Base Camp, 56°08'N, 76°34'W, *Ireland 21248, 21394*. Reported from British Columbia, Alberta, Newfoundland, Yukon Territory and Northwest Territories.

*Orthothecium chryseum* var. *cochlearifolium* (Lindb.) Limpr.--Lac Guillaume-Delisle, La Tourelle, 22 km N of Le Goulet, 56°21'N, 76°27'W, *Ireland 21190*. Reported from Northwest Territories and Arctic Archipelago.

*Polytrichum sexangulare* Brid.--Lac Guillaume-Delisle, University of Laval Base Camp, 56°08'N, 76°34'W, *Ireland 21057, 21164, 21326*. Reported from British Columbia, Alberta, Labrador, Yukon Territory, Northwest Territories and Arctic Archipelago.

*Schistidium holmenianum* Steere & Brassard--Lac Guillaume-Delisle, near University of Laval Base Camp, 56°08'N, 76°34'W, *Ireland 21053, 21113, 21127, 21370*; Lac Guillaume-Delisle, La Tourelle, 22 km N of Le Goulet, 56°21'N, 76°27'W, *Ireland 21177*; Mosquito Bay, 61°25'N, Aug 1898, *Low s.n.* (as *Racomitrium depressum* Lesq.). Reported from Northwest Territories and Arctic Archipelago.

*Timmia sibirica* Lindb. & H. Arnell--Lac Guillaume-Delisle, near University of Laval Base Camp, 56°08'N, 76°34'W, *Ireland 21155*. Reported by Brassard (1979) from Yukon Territory and Arctic Archipelago.

I am very grateful to Drs. P. Morisset and S. Payette (Centre d'Etudes Nordiques, Université Laval), their students and staff, for their generous support and field assistance at the camps in northern Quebec. I thank C. E. Garton, Lakehead University, for allowing me to report his new records.

Brassard, G. R. 1979. The moss genus Timmia. 1. Introduction, and revision of T. norvegica and allied taxa. Lindbergia 5: 39-53.

Ireland, R. R., C. D. Bird, G. R. Brassard, W. B. Schofield & D. H. Vitt. 1980. Checklist of the mosses of Canada. Natl. Mus. Canada Publ. Bot. 8: i-xii, 1-75.

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# MOSSES FROM THE STATE OF MAINE

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Mosses in Maine appear to have been reasonally well collected as judged from the number of species vicariously attributed to the state in the species range-descriptions of floras and revisionary work. There has, however, been little attention given to documenting the Maine moss flora, at the county level, by means of referenced specimens. Nearly all the mosses attributed to the state can be found in three sources: short, more or less anecdotal reports; lests of mosses collected on Mt. Katahdin or Mt. Desert Island; and in the specimens examined lists of revisionary studies.

Since the early anecdotal reports cite few specimens and many revisionary studies give only selected specimens examined, most mosses from Maine have been reported from either Hancock (Mt. Desert Island) or Piscataquis (Mt. Katahdin) counties.

The following is a list of mosses from several counties in Maine. All reports in this list represent county records; a few may represent state records. However, the literature on Maine mosses is so scattered it is difficult to be certain of those mosses reported from the state. For that reason "apparent" state records are not indicated.

The nomenclature and taxonomic concepts of the species in this list follow Crum and Anderson (1981) with the exception of Sphagnum which follows Crum (1984). Voucher specimens are deposited in the herbarium of Bruce H. Allen.

In order to minimize the citation of specimens, locality information is summarized below along with the collection numbers made in those localities. Within the species list, the number in parentheses after each county refers to the collection numbers in the locality list. Although a number of collections were made for many of the species, only a single collection is referenced for each county.

Androscoggin County
1. Lake Androscoggin, ca. 2.5 mi SW of Wayne and along the Dead River ca. 1 mi N of Leeds, Allen 2426-2431.

Cumberland County
1. Along tbe Androscoggin River, vicinity of Brunswick, Allen 2000-2002.
2. Orrs Island, vicinity of Lowell Cove and Bailey Island, Jaquish Gut, Allen 2441-2448.

Hancock County
1. Mt. Desert Island, Allen 2032-2125, 3692-3756.
2. Fox Pond, ca. 6 mi NE of Franklin, Allen 2126-2137.

Kennebec County
1. Mill stream through North Monmouth, Allen 2432-2435.

Lincoln County
1. Spruce Point, ca. 1.5 mi SE of Boothbay Harbor, Allen 227-262, 1230-1305, 1338-1341, 1528-1548, 2003-2021, 5018-5025.
2. Monhegan Island, ca. 11 mi ESE of Pemaquid Point, Allen 1306-1319, 3706-3710, 3759, 3760.
3. Boothbay Harbor, along Townsend Avenue, Allen 1527a, 1527b.
4. Damariscotta Lake, above Damariscotta Mills, Allen 1549-1552, 3757, 3758.

5. Backnarrows, N of Lewis Cove, ca. 1 mi E of Boothbay Harbor, Allen 2022-2031, 3682, 3683.
6. Squirrel Island, Allen 2424, 2425.
7. David Island, The Eddy, ca. 1 mi E of Wiscasset, Allen 2436, 2437.

Sagadahoc County
1. Popham Beach, along Rt. 209, Allen 2438, 2439, 3684-3690.

Waldo County
1. Moosepoint State Park, ca. 2 mi E of Belfast, Allen 3691.

Washington County
1. Quoddy Head, ca. 2 mi SE of Lubec, Allen 2138, 2139.

## SPECIES LIST

AMBLYSTEGIACEAE
Amblystegium riparium (Hedw.) B.S.G.--Kennebec (2433); Lincoln (1307).
A. tenas (Hedw.) C. Jens.--Kennebec (2432).
Calliergon cordifolium (Hedw.) Kindb.--Cumberland (2446), Lincoln (1547).
Drepanocladus fluitans (Hedw.) Warnst.--Lincoln (2424).
D. uncinatus (Hedw.) Warnst.--Lincoln (2026)
Hygrohypnum eugyrium (B.S.G.) Loeske--Lincoln (250).
Sciaromium lescurii (Sull.) Broth.--Lincoln (2029).

AULACOMNIACEAE
Aulacomnium androgynum (Hedw.) Schwaegr.--Lincoln (1254).
A. palustre (Hedw.) Schwaegr.--Lincoln (2425).

BARTRAMIACEAE
Bartramia pomiformis Hedw.--Lincoln (3757a).
Philonotis fontana (Hedw.) Brid.--Lincoln (3707).

BRACHYTHECIACEAE
Brachythecium plumosum (Hedw.) B.S.G.--Cumberland (2441).
B. populeum (Hedw.) B.S.G.--Hancock (2083); Lincoln (248).
B. rivulare B.S.G.--Hancock (2130).
B. rutabulum (Hedw.) B.S.G.--Lincoln (1545).
B. salebrosum (Web. & Mohr) B.S.G.--Lincoln (241).
B. velutinum (Hedw.) B.S.G.--Lincoln (1252).
Isothecium myosuroides Brid.--Cumberland (2448); Hancock (2114); Lincoln (3760); Sagadahoc (3688); Washington (2138).

BRYACEAE
Bryum muehlenbeckii B.S.G.--Hancock (3696).
Pohlia nutans (Hedw.) Lindb.--Lincoln (262).

BUXBAUMIACEAE
Diphyscium foliosum (Hedw.) Mohr--Lincoln (1231).

CLIMACIACEAE
Climacium americanum Brid.--Lincoln (3757b).

DICRANACEAE
Dicranella heteromalla (Hedw.) Schimp.--Lincoln (2030).
Dicranum flagellare Hedw.--Androscoggin (2427); Lincoln (2005); Sagadahoc (2439).
D. fulvum Hook.--Androscoggin (2428); Lincoln (1240).
D. fuscescens Turn.--Lincoln (1248).
D. majus Sm.--Lincoln (1319).
D. montanum Hedw.--Cumberland (2443); Lincoln (2008).
D. ontariense Peters.--Lincoln (1239).
D. polysetum Sw.--Lincoln (5018).
D. scoparium Hedw.--Lincoln (2015).
Leucobryum glaucum (Hedw.) Ångstr. ex Fries--Lincoln (253).
Rhabdoweisia crispata (With.) Lindb.--Sagadahoc (3688).

DITRICHACEAE
Ceratodon purpureus (Hedw.) Brid.--Lincoln (3708).
Ditrichum lineare (Sw.) Lindb.--Androscoggin (2426).
D. pallidum (Hedw.) Hampe--Lincoln (261).
D. pusillum (Hedw.) Hampe--Lincoln (1255).
FABRONIACEAE
Anacomptodon splachnoides (Froel. ex Brid.) Brid.--Hancock (2128).
FISSIDENTACEAE
Fissidens bryoides Hedw.--Hancock (2052b).
FONTINALACEAE
Dichelyma capillaceum (With.) Myr.--Androscoggin (2431).
D. flacatum (Hedw.) Myr.--Hancock (2133).
Fontinalis novae-angliae Sull.--Kennebec (2435); Lincoln (3706).
F. sphagnifolia (C. Müll.) Wijk & Marg.--Hancock (2093).
FUNARIACEAE
Funaria hygrometrica Hedw.--Lincoln (1256).
GRIMMIACEAE
Grimmia alpicola Hedw. var. alpicola--Hancock (2044); Lincoln (246).
G. alpicola var. rivularis (Brid.) Wahlenb.--Cumberland (2000).
G. apocarpa Hedw.--Lincoln (243).
G. agassizii (Sull. & Lesq. ex Sull.) Jaeg.--Cumberland (2002).
G. maritima Turn.--Sagadahoc (3690).
Racomitrium aciculare (Hedw.) Brid.--Lincoln (2022).
R. heterostichum Hedw. var. heterostichum--Lincoln (2437).
R. heterostichum var. microcarpon (Hedw.) Boul.--Lincoln (1540).
HEDWIGIACEAE
Hedwigia ciliata (Hedw.) P.-Beauv.--Lincoln (238).
HYLOCOMIACEAE
Hylocomium splendens (Hedw.) B.S.G.--Lincoln (1246).
Pleurozium schreberi (Brid.) Mitt.--Lincoln (1265).
Rhytidiadelphus triquetrus (Hedw.) Warnst.--Waldo (3691).
HYPNACEAE
Callicladium haldanianum (Grev.) Crum--Lincoln (2025).
Herzogiella striatella (Brid.) Iwats.--Lincoln (1291).
H. turfacea (Lindb.) Iwats.--Lincoln (2004).
Hypnum cupressiforme Hedw.--Cumberland (2001); Lincoln (2436).
H. fertile Sendtn.--Lincoln (1290).
H. imponens Hedw.--Lincoln (255).
H. pallescens (Hedw.) P.-Beauv.--Lincoln (249).
Isopterygium elegans (Brid.) Lindb.--Cumberland (2442).
Ptilium crista-castrensis (Hedw.) DeNot.--Washington (2139).
LESKEACEAE
Leskeella nervosa (Brid.) Loeske--Hancock (2120).
MNIACEAE
Mnium hornum Hedw.--Lincoln (1548).
NECKERACEAE
Neckera pennata Hedw.--Lincoln (1532).
ORTHROTRICHACEAE
Orthotrichum anomalum Hedw.--Lincoln (1549).
O. obtusifolium Brid.--Lincoln (1527b).
O. sordidum Sull. & Lesq. ex Aust.--Lincoln (1527a).
O. stellatum Brid.--Hancock (2126a).
Ulota crispa (Hedw.) Brid.--Lincoln (1339).
U. hutchinsiae (Sm.) Hamm.--Lincoln (2007).
U. phyllantha Brid.--Hancock 3704a); Sagadahoc (3689).
PLAGIOTHECIACEAE
Plagiothecium laetum B.S.G.--Hancock (3734); Lincoln (1263).

### POLYTRICHACEAE

Pogonatum pensilvanicum (Hedw.) P.-Beauv.--Lincoln (1338).

Polytrichum commune Hedw.--Lincoln (244).

P. juniperinum Hedw.--Lincoln (1310).

P. pallidisetum Funck--Lincoln (1272).

### POTTIACEAE

Trichostomum tenuirostre (Hook. & Tayl.) Lindb.--Hancock (2105).

### SPHAGNACEAE

Sphagnum capillifolium (Ehrh.) Hedw. var. capillifolium--Hancock (2124); Lincoln (5019).

S. capillifolium var. tenerum (Sull. & Lesq. ex Sull.) Crum--Hancock (2089).

S. compactum DC. ex Lam. & DC.--Hancock (2039).

S. cuspidatum Ehrh. ex Hoff. var. cuspidatum--Lincoln (1298).

S. fimbriatum Wils. ex Wils. & Hook.f. in Hook.f.--Lincoln (1340).

S. flavicomans (Card.) Warnst.--Lincoln (5022).

S. girgensohnii Russ.--Hancock (2123); Lincoln (1303).

S. imbricatum Hornsch. ex Russ.--Lincoln (3682).

S. magellanicum Brid.--Lincoln (5020).

S. palustre L.--Hancock (2125); Lincoln (1304).

S. pylaesii Brid.--Hancock (3705).

S. recurvum P.-Beauv. var. recurvum--Lincoln (5025).

S. recurvum var. brevifolium (Lindb. ex Braithw.) Warnst.--Hancock (2070).

S. subsecundum Nees ex Sturm var. inundatum (Russ.) C. Jens.--Hancock (2049); Lincoln (2031).

S. subsecundum var. rufescens (Nees & Hornsch.) Hüb.--Lincoln (2031).

S. tenellum (Brid.) Bory--Lincoln (1295).

### TETRAPHIDACEAE

Tetraphis pellucida Hedw.--Lincoln (228).

Crum, H. 1984. Sphagnopsida, Sphagnaceae. North Amer. Fl. II, 11: 1-180.

_____ & L. E. Anderson. 1981. Mosses of Eastern North America. 2 vols. Columbia University Press, New York.

# LICHENS AND BRYOPHYTES OF THE SANTA ROSA PLATEAU NATURE CONSERVANCY RESERVE, RIVERSIDE COUNTY, CALIFORNIA

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The Santa Rosa Plateau is a topographic unit in the southern part of the Santa Ana Mountains of the Peninsular Ranges, almost all of it in southern Riverside County. This Nature Conservancy Reserve, at about 610 meters elevation, consists of a plateau with mesas, canyons and low hills and is bordered in all sides by steep, chaparral-covered slopes. The plateau has mostly a grass-oak woodland cover, with rocky pavements and rim-rock 'breaks'. A catalog of the vascular plants, together with a general introduction to the location, characteristics, and plant communities, of the Plateau was published by Lathrop & Thorne (1985) and should be referred to for generalities in the context of the lichen flora listed below.

The following list of lichens was assembled after a three-day collecting trip to selected portions of the Plateau November 1-3, 1986, by the three of us. We were greatly aided by Dr. F. Thomas Griggs and Mary A. McCrary, resident custodians of the Reserve.

The names given are as up-to-date as possible. When our name differs from that given in Tucker & Jordan (1979), hereafter referred to as "the catalog", their name is given in parentheses.

A catalog generated by an investigation of so short a duration might appear to be premature. However, lichen collecting has an advantage over vascular plant collecting in that the lichens are always present, and to a lichenologist of broad experience, the secret of good coverage is in becoming sensitive to the different habitats, micro- and macro-, and trying to make an exhaustive survey of rocks, trees and soil. Three pairs of eyes are much more efficient than one. We feel that our list is adequate if not quite complete.

The areas visited by our party were all within easy walking distance of the Santa Rosa Ranch houses. These may be referred to by the following codes: MC= truncated summit of Mesa Colorado (see Lathrop & Thorne, Fig. 4); MP: Mesa de la Punta (l.c. fig. 5, 7); EV: a mesic ravine leading down from the west rim toward the ranch; SRR: vicinity of ranch houses; RC: Ranch Creek (equivalent to l.c. fig. 9); ST: Sycamore trail (also equivalent to l.c. fig. 9).

A complete set of the lichens is deposited in herbarium COLO, Boulder, with selected numbers at Santa Barbara Natural History Museum. The "collection numbers" refer to the lichen accession series in COLO.

**Acarospora fuscata** (Schrad.) Arn. Common on small rocks, MC, 82052; on large outcrops, west end MC, 82095.

**Acarospora schleicheri** (Ach.) Mass. Common on small rocks, occasional on soil, MC, 82056.

**Aspicilia cf. americana** B. de Lesd. On massive granite boulders, ST, 82155. A large, thin, dull-greenish-gray thallus with flat to concave areoles, not reactive chemically, seems to match material from the type locality in New Mexico, but names are applied to *Aspicilia* with great trepidation.

**Aspicilia sp.** (cf. "*Lecanora*" *gibbosula* H. Magn.). Abundant on large outcrops of mesa lip, MC, 82096, 82104; on massive granite boulders, ST, 82156.

**Bacidia, sp. indet.** Parasitic on thallus of *Aspicilia*, ST, 82157.

**Buellia badia** (Fr.) Mass. Infrequent on small rocks, 82061. Differing from *B. pullata* by having strongly ascending and clumped squamules (*B. pullata* forms a thin, flat thallus).

**Buellia pullata** Tuck. Very common on small rocks, MC, 82059, 82077 .

**Buellia sp. indet.** Parasitic on thallus of *Thelomma mammosum*, MC, 82082.

**Caloplaca californica** Zahlbr. On eroded ends of vertical fence posts, MC, 82067; on *Quercus engelmannii*, 82119.

**Caloplaca cerina** (Ehrh.) Th. Fr. Infrequent on *Quercus agrifolia*, MC, 82091.

**Caloplaca cf. chrysophthalma** Degel. Frequent on trunks of *Quercus engelmannii*, MP, 82145. Our material differs from typical Swedish collections by having a distinct continuous pale yellow thallus with soralia that tend to run together. In the typical plant the thallus is extremely thin and almost invisible, and the soralia are scattered and probably have finer soredia. It is likely that western North American material does not belong to this species.

**Caloplaca decipiens** (Arn.) J. Stein. On an isolated rock outcrop used as a bird hunting perch, EV, 82120.

**Caloplaca modesta** (Zahlbr.) Fink (*C. lobulata*, incorrectly, in catalog). Frequent on small boulders, MC, 82080, 82092.

**Caloplaca saxicola** (Hoffm.) Nordin (*C. murorum* of catalog). Common on small rocks, MC, 82051.

**Caloplaca stanfordensis** H. Magn. Common on bark of *Quercus agrifolia*, MC, 82074, 82090.

**Candelaria concolor** (Dicks.) B. Stein and **var. effusa** (Tuck.) Burnh. Common on fence posts, MC, 82068, 82106; on *Quercus engelmannii*, SRR, 82141.

**Candelariella vitellina** (Ehrh.) Muell.-Arg. Common on small boulders, MC, 82081.

**Cetraria merrillii** DuRietz. Scattered and very infrequent on slender twigs of sapling oaks in streambed, EV, 82131.

**Chrysothrix candelaris** (L.) Laundon (*Lepraria* of catalog). Infrequent on sapling oaks in streambed, EV, 82133.

**Cladonia chlorophaea** (Flk. *ex* Somm.) Spreng. On bases of shrubs of *Adenostoma*, MC, 82113.

**Cladonia pyxidata** (L.) Fr. At bases of *Adenostoma* shrubs, MC, 82803.

**Cladonia rei** Schaer. (*C. nemoxyna*). Infrequent on shaded rocks over moss, MC, 82094.

**Collema nigrescens** (Huds.) DC. Rare, On *Quercus engelmannii*, SRR, 82142.

**Collema texanum** Tuck. Infrequent on soil, MC, 82072.

**Dermatocarpon lachneum** (Ach.) A. L. Sm. (*D. hepaticum* of Calif. lit.). Common on compacted soil, MC, 82071.

**Dimelaena oreina** (Ach.) Norm. Found only once, a large colony on top of a massive smooth granite stream boulder above flood mark, ST, 82152.

**Dimelaena radiata** (Tuck.) Hale & Culb. Very infrequent, found on only one massive boulder beside potholes, RC, 82147.

**Diploschistes actinostomus** (Pers.) Zahlbr. On granite outcrops on slope of west rim, MC, 82099.

**Diploschistes scruposus** (Schreb.) Norm. Common on small rocks and soil, MC, 82065.

**Evernia prunastri** (L.) Ach. Common on shrubs of Adenostoma, MC, 82111; on sapling oaks in streambed, EV, 82127.

**Flavopunctelia flaventior** (Stirt.) Hale (Parmelia). On large granite outcrops of upper lip of mesa, MC, 82069-70; on Quercus agrifolia, 82087.

**Flavopunctelia soredica** (Duby) Hale (Parmelia ulophyllodes, incorrectly as Parmelia soredica in catalog). Common on Quercus engelmannii, west rim MC, 82115; on Q. agrifolia, ST, 82154. Similar to F. flaventior but with the soredia marginal rather than dorsal. This taxon should be added to the catalog.

**Hypogymnia imshaugii** Krog. Common on shrubs of Adenostoma, MC, 82110; on twigs of sapling oaks in streambed, EV, 82134, 82135.

**Hypogymnia mollis** Pike & Hale. On small twigs of oak saplings in streambed, EV, 82125. This taxon was published later than the catalog, and should be added.

**Lecanora demissa** (Flot.) Zahlbr. Rare, on vertical faces near the bases of gigantic monolithic granite boulders, SRR, 82140. Previously unreported from California but represented in Herb. COLO by specimens from San Clemente Island, Weber & Santesson 42046, 42881; Santa Catalina Island, Weber & Santesson 42992; Riverside Co.: Riefner 86-392; Amador Co., Weier 1050, and Madera Co., Larson 81-025. I have also collected it on the Galapagos Islands and near Santiago, Chile. The taxon was previously known from central Europe. Lecanora demissa is anomalous in the genus and probably will have to be removed, possibly to form a new monotypic family. Its appearance is that of a very slender-lobed rosettiform dull gray-brown Physcia about 1 cm diam with small patches of soredia in the middle of the thallus. When collected fertile, in Europe, it has simple colorless spores, which would rule out placing it with Physcia, Physciopsis or Phaeophyscia. It was first recognized in California by Rolf Santesson, who identified it in the field.

**Lecanora gangaleoides** Nyl. Locally abundant on one granite outcrop below the top of the west rim, MC, 82103. Not listed in the catalog, but amply documented by Brodo (1984).

**Lecanora mellea** Weber. Infrequent on enormous boulders near the stream, SRR, 82121. This taxon was published later than the catalog, and should be added.

**Lecanora pacifica** Herre. Rare, found only once on a burned trunk of Quercus agrifolia, ST, 82153.

**Lecidea grisella** (Flk.) Nyl. Infrequent on granite outcrops, west rim, 82109; on rock exposed by stream erosion, EV, 82139.

**Lecidea scotopholis** (Tuck.) Herre. One of the most abundant species on rocks, MC, 82057, 82108. Extremely variable in thallus form, sometimes a flat crust, but grading to ascending-squamulose, and from brown to almost black.

**Lecidea tessellata** (Ach.) Flk. Infrequent on small rocks, MC, 82058.

**Lecidella carpathica** Koerb. (Lecidea). Infrequent on small rocks, MC, 82055.

**Leciographa cf. parasitica** Mass. Non-lichenized lichen parasite on Pertusaria sp. indet., on Quercus engelmannii, west rim MC, 82117.

**Lepraria, sp. indet.** On bases of shrubs of Adenostoma, MC, 82114.

**Leptogium lichenoides** (L.) Zahlbr. Infrequent, on moss, MC, 82107; SSR, 82124. Evidently the lack of high relative humidity is responsible for the paucity of cyanophilous lichens here.

**Melanelia subaurifera** (Nyl.) Essl. On twigs of sapling oaks in streambed, EV, 82130.

**Microthelia aterrima** (Anzi) Zahlbr. Abundant on low cobbles and bases of monolithic granite boulders near streamsides, SSR, 82143. An easily overlooked lichen which appears as a dark stain on the rock.

**Arthonia radiata** (Pers.) Ach. On a dead trunk of Quercus agrifolia, MP, 82144.

**Mycocalicium subtile** (Pers.) Szat. On dead wood of leaning Quercus agrifolia, ST, 82151.

**Neofuscelia subhosseana** Essl. (brown Parmelia spp. of catalog). Infrequent on small rocks, MC, 82053; on huge boulders, SRR, 82126.

**Ochrolechia pallescens** (L.) Mass. On sapling oaks in streambed, EV, 82128.

**Peltula euploca** (Ach.) Wetmore. On horizontal flow lines of huge granite outcrops of lip of plateau, MC, 82075.

**Pertusaria amara** (Ach.) Nyl. Common on Quercus engelmannii, west rim MC, 82105, 82118.

**Pertusaria sp. indet.** Sterile, on Quercus agrifolia, MC, 82804, 82093.

**Phaeophyscia hirsuta** (Meresch.) Essl. (Physcia ciliata of catalog?). Abundant on Quercus engelmannii, west rim MC, 82101, 82136.

**Physcia adscendens** (Fr.) Oliv. Infrequent on Quercus agrifolia, MC, 82089.

**Physcia aipolia** (Ehrh.) Hampe. Infrequent on Quercus engelmannii, MC, 82137.

**Physcia callosa** Nyl. Common on shaded vertical cliffs, west rim MC, 82097; ST, 82161.

**Physconia detersa** (Nyl.) Poelt. (P. grisea f. detersa of catalog). Common on Quercus agrifolia, west rim MC, 82100; ST, 82149-50.

**Protoparmeliopsis muralis** (Schreb.) Choisy (Lecanora). Small horizontal surfaces of small rocks. MC, 82050.

**Pseudoparmelia caperata** (L.) Hale (Parmelia). Common on large fixed granite outcrops on lip of plateau, MC, 82064.

**Psora pacifica** Timdal [unpublished]. Common on compacted soil, MC, 82073.

**Psora, species indet.** Infrequent on small rocks, MC, 82063. A brown Psora with central convex apothecia, hymenium K-. Possibly undescribed but common throughout southern California.

**Punctelia subrudecta** Nyl. (Parmelia of catalog). Common on shrubs of Adenostoma, MC, 82112; on Quercus engelmannii, 82116, 82138; on oak saplings, EV, 82129.

**Ramalina cf. cochlearis** Zahlbr. Infrequent, on Quercus engelmannii, west rim MC, 82102. A small caespitose plant with bursting sorediate branch apices.

**Spilonema revertens** Nyl. On horizontal flow lines of huge granite outcrops on lip of plateau, MC, 82076.

**Teloschistes chrysophthalmus** (L.) Th. Fr. Infrequent on Quercus agrifolia, MC, 82098.

**Thelomma mammosum** (Hepp) Mass. (Cyphelium bolanderi). Common on small boulders, MC, 82079; on fixed outcrops, RC, 82148.

**Thelomma occidentale** (Herre) Tibell (Cyphelium). On eroded ends of vertical fence posts, MC, 82066.

**Trapelia involuta** (Tayl. & MacKay) Hertel. On soft rocks protruding from road cut and periodically wetted, MP, 82146.

**Trapeliopsis flexuosa** (Fr.) Coppins & James (Lecidea). Common on fence pales, MC, 82086, 82122.

**Trapeliopsis granulosa** (Hoffm.) Lumbsch ex Hertel (Lecidea). Frequent on old fence pales, MC, 82085; EV, 82133.

**Trapeliopsis wallrothii** (Flk. ex Spreng.) Hertel & Schneider (Lecidea). Common on soil around the bases of boulders, MC, 82078.

**Umbilicaria phaea** Tuck. Abundant on small rocks, MC, 82060.

**Usnea, sp. indet.** A caespitose, sorediate species on fine twigs of sapling oaks in streambed, EV, 82132.

**Xanthoparmelia conspersa** (Ehrh. *ex* Ach.) Hale (*Parmelia*). Common on small rocks, MC, 82054.

**Xanthoparmelia lineola** (Berry) Hale (*Parmelia*). Common on small rocks, MC, 82062; ST, 82160. Recognized in the field by its tightly adnate, non-isidiate thallus with pale to brown underside.

**Xanthoparmelia mexicana** (Gyel.) Hale. On massive granite boulders, ST, 82158.

**Xanthoparmelia taractica** (Kremp.) Hale. On tops of massive granite boulders, ST, 82159.

**Xanthoria fallax** (Hepp) Arn. Locally abundant on *Quercus agrifolia*, MC, 82088.

Bryophytes were only collected incidentally, since the season was extremely dry. Another expedition should be mounted during a season with a more moist climatic regime.

**Bryum gemmiparum DeNot.** Sterile, on wall of pothole, RC, 91952.

**Leptodictyum riparium** (Hedw.) Warnst., "*laxirete*" phase. In a rock pool in Ranch Creek, 91953.

**Grimmia laevigata** (Brid.) Brid. Abundant on rocks of mesatop, MC, 91957.

**Grimmia pilifera** P. Beauv. Abundant on massive granite boulders, ST, 91948.

**Grimmia pulvinata** (Hedw.) Sm. *ex* Sm. & Sowerby. Common on massive granite boulders. ST, 91949.

**Homalothecium arenarium** (Lesq.) Lawton. On soil banks, west rim of MC, 91958.

**Orthotrichum rupestre** Schleich. *ex* Schwaegr. Common on sides of massive granite boulders, ST, 91951.

**Riccia nigrella** Lam. in DC. On soil of mesatop in grassland with vernal pools, MC, 91955.

**Riccia trichocarpa** Howe. On soil of mesatop in grassland with vernal pools, MC, 91956.

**Scleropodium tourretii** (Brid.) L. Koch. On soil banks above intermittent stream, EV, 91954.

**Tortula princeps** De Not. Common on massive granite boulders, ST, 91947, 91950.

Brodo, Irwin M. 1984. The North American species of the *Lecanora subfusca* group. Nova Hedwigia, Beih. 79:63-185.

Lathrop, Earl W., & Robert F. Thorne. 1985. A flora of the Santa Rosa Plateau. S. Calif. Botanists Special Publ. 1:1-39.

Tucker, Shirley C., & William Paul Jordan. 1979. A catalog of California lichens. Wasmann J. Biol. 36:1-105.

# FOUR LICHENS NEW TO NORTH AMERICA COLLECTED ON THE 1985 ABLS FORAY IN FLORIDA

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The 1985 ABLS Foray in conjunction with the meeting of AIBS in Gainesville was ably planned and amiably led by Dana Griffin, who selected some very productive collecting localities. All four of the lichens reported here were collected at the first stop on our trip (Marion County, just E of Oklawaha River on Fla. Hwy. 316, Ocala National Forest, pine-scrub oak woods). Physcia fragilescens was also collected at the last collecting site (Highlands County, Highlands Hammock State Park, Wild Orange Grove Trail, subtropical hardwood swamp). None of the species are unexpected occurrences and are species with tropical-subtropical distributions. It is this element of the North American lichen flora which is the least known and many more taxa remain to be reported. Vouchers are deposited at NY.

Bulbothrix isidiza (Nyl.) Hale -- This species is distinguished by the combination of isidia, pale lower side and salazinic acid. Hale (1976) reports neotropical specimens from Mexico south to Paraguay.

Coccocarpia domingensis Vainio -- This is the isidiate counterpart of the apparently more common C. stellata Tuck. Arvidsson (1982) reports C. domingensis from Hispaniola and Guatemala south to Chile. The species seems appropriately named since at moderate elevations in the Pico Duarte region of the Dominican Republic C. domingensis literally covers many tree trunks.

Crocynia pyxinoides Nyl. -- Although Crocynia has been much misused in the sense of Lepraria, there are at least two fertile lecideoid species which are assigned to the genus, the type C. gossypina (Sw.) Massal. and C pyxinoides. Crocynia pyxinoides is characterized by a brown to black hypothallus outlining the bluish to whitish, ecorticate, "fuzzy", almost foliose looking thallus. The apothecia are sessile and dark brown. The chemistry is not entirely clear but most specimens contain atranorin and traces of the stictic acid complex. Crocynia gossypina has norstictic acid, barbatic acid or both, possibly with accessory salazinic acid. Its hypothallus is not conspicuous and its apothecia are paler and weakly stipitate. There is also at NY a collection of Crocynia pyxinoides made by Langlois at Bay St. Louis, Mississippi in 1895. It, like the Florida collection, is sterile and has a tendency to form sorediate patches. Perhaps a consequence of being at the edge of its range. The New York Botanical Garden has specimens from Trinidad, Venezuela and Brazil, where it is common.

_Physcia fragilescens_ Zahlbr. -- Recently recognized by Moberg (1986) from Africa. American specimens are characterized by marginal isidia breaking down to form discrete soralia, and by white-mottled, shiny upper surface and black lower surface. There is also at NY a specimen collected in Sharkey County, Mississippi by G. T. Johnson in 1978.

Arvidsson, L. 1982. A monograph of the lichen genus _Coccocarpia_. Opera Bot. 67: 1-96.

Hale, M. E. 1976. A monograph of the lichen genus _Bulbothrix_ Hale (Parmeliaceae). Smithsonian Contr. Bot. 32: 1-29.

Moberg, R. 1986. The genus _Physcia_ in East Africa. Nord. J. Bot. 6: 843-864.

# SOME DISTINCTIVE TROPICAL PYRENOLICHENS IN THE SOUTHEASTERN UNITED STATES

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*Homo lichenologicus* like much of the animal kingdom is attracted by bright colors. The six species of pyrenolichens discussed below have red, orange or yellow thalli and are consequently more often collected and more easily identified than most members of this group. However, it is only in the last year that I have been able to obtain the type specimens needed to establish the correct names of some of these species. Unfortunately some changes have had to be made.

There are two American taxa of Pyrenulaceae which have red pigmented thalli. The coloration ranges from the entire surface brilliant crimson to merely a tinge of red on and near the ascomata. One was previously known as *Bottaria cruentata* Muell. Arg. (muriform spores, fig. 1), the other as *Melanotheca cruenta* (Mont.) Muell. Arg (4-celled spores, fig. 3). Both have identical ascomata which tend to be aggregated and hamathecia filled with abundant oily droplets. A few specimens even have rather intermediate spores (fig. 2). Despite this I am inclined to maintain them as distinct species as their distributions differ.

However, examination of the type of *Bottaria composita* Massal., the type species of *Bottaria*, has shown it is identical to *Mycoporum pycnocarpum* Nyl. and therefore *Bottaria* is a synonym of *Mycoporum* Flot. ex Nyl. Moreover, the type species of *Melanotheca* is not at all closely related to *M. cruenta*. The spore and hamathecium characters are very different. Also, shade forms of *M. cruenta* without much pigment and with solitary ascomata are commonly identified as *Pyrenula*. Further there is some question whether *Melanotheca* s. str. should be maintained as a genus separate from *Pyrenula*. If it is to be retained in any natural sense, it will have to be restricted to a small number of species, perhaps including some now assigned to *Pyrenula*, e.g., *P. aspistea* (Ach.) Ach. and possibly *P. coryli* Massal. Thus neither *Bottaria* nor *Melanotheca* can be used for the species with red thalli. There are then two choices, transfer them to *Pyrenula* or recognize the genus *Bottariomyces* Ciferri & Tomaselli which is typified with *Bottaria cruentata*. Since the spore and hamathecium type are not uncommon in *Pyrenula* a segregate genus would have to founded on the single character of the red pigmented thallus. However, two species, unrelated to the *cruenta*-group and each other, also have identical red thalli: *Melanotheca cruentula* (Nyl.) Zahlbr. and an undescribed species with muriform spores from the Dominican Republic best placed in *Pyrenastrum*. Thus it seems most logical to assign the two American species to *Pyrenula* as *P. cruenta* (Mont.) Vainio and *P. cruentata* (Muell. Arg.) R. C. Harris ined. (combination to be made in forthcoming North American checklist). The only other species which belongs to this group is *Pyrenula subdecolor* (Nyl.) R. C. Harris, comb. nov. (*Trypethelium cruentum* ***subdecolor** Nyl., Lich. Jap. 93. 1890) from the Bonin Islands, differing from *P. cruenta* only in having smaller spores.

It is my belief that the muriform spored *P. cruentata* is a relatively recent, more or less local modification of the more widespread *P. cruenta*. It should be noted that this is only one example of two closely related species which "transgress" the limits of Saccardo/Zahlbruckner "spore" genera and show them up as phylogenetic nonsense. *Pyrenula cruentata* is endemic to the northwestern Caribbean region (Florida, Bahamas, Cuba, Jamaica, Cayman Is. and Belize). In Florida it is mostly confined to the Florida Keys except for a single collection from Highlands County. *Pyrenula cruenta* ranges from Brazil and Bolivia through the West Indies to the Coastal Plain from Texas to Virginia. In the Paleotropics I have seen specimens from South Africa, Mauritius, Rodriguez and Queensland.

Among the species with yellow and orange thalli, two are orange (greenish in shade forms) and two are yellow (rarely darkening to orange especially over ascomata, often fading to nearly white except over ascomata). Faded or discolored forms are easily separated by the spores. The orange species are *Pyrenula cerina* Eschw. and *Trypethelium aeneum* (Eschw.) Zahlbr. They can usually be distinguished with a hand lens since the thallus of the *Pyrenula* has numeous white pseudocyphellae while the *Trypethelium* does not. Also the former has brown 4-celled spores, 6-celled in some Mexican populations (figs. 4,5) and the latter smaller colorless spores (fig. 6). *Pyrenula cerina* is an American endemic ranging from Florida, Bermuda and the Bahamas through the West Indies to northern South America and the Galapagos. In Florida it is mainly restricted to the Keys, Dade and Monroe counties on the mainland with the northernmost locality on Sanibel Island, Lee County. *Trypethelium aeneum* has a similar distribution in the Americas ranging further south to Brazil and Bolivia and further north in peninsular Florida to Osceola County. It is also known from Sri Lanka and Borneo.

The yellow species both belong to the genus *Anthracothecium* s. lat., *A. ochraceoflavum* (Nyl.) Muell. Arg. and *A. ochraceoflavens* (Nyl.) Zahlbr. One of the characteristics of brightly colored lichens seems to be that a rather limited amount of imagination is applied to choosing epithets, i.e., cruenta-cruentata-cruentula, ochraceoflavum-ochraceoflavens. Some care is needed to keep them straight. *Anthracothecium ochraceoflavum* has spores 13-23 x 9-13 um with four transverse rows usually of four cells each (fig. 7) while *A. ochraceoflavens* has spores 23-35 x 11-17 um with more than four rows of cells usually of more than four cells (fig. 8). Like *Pyrenula cruentata*, *Anthracothecium ochraceoflavens* seems to be an American modification of a more widespread species. *Anthracothecium ochraceoflavens* occurs in the West Indies, Florida Keys and north to Duval County in peninsular Florida while *Anthracothecium ochraceoflavum* is common in the Paleotropics and is known in the Neotropics from the Galapagos, Venezuela, Costa Rica, Dominican Republic, Cuba and throughout Florida to Louisiana.

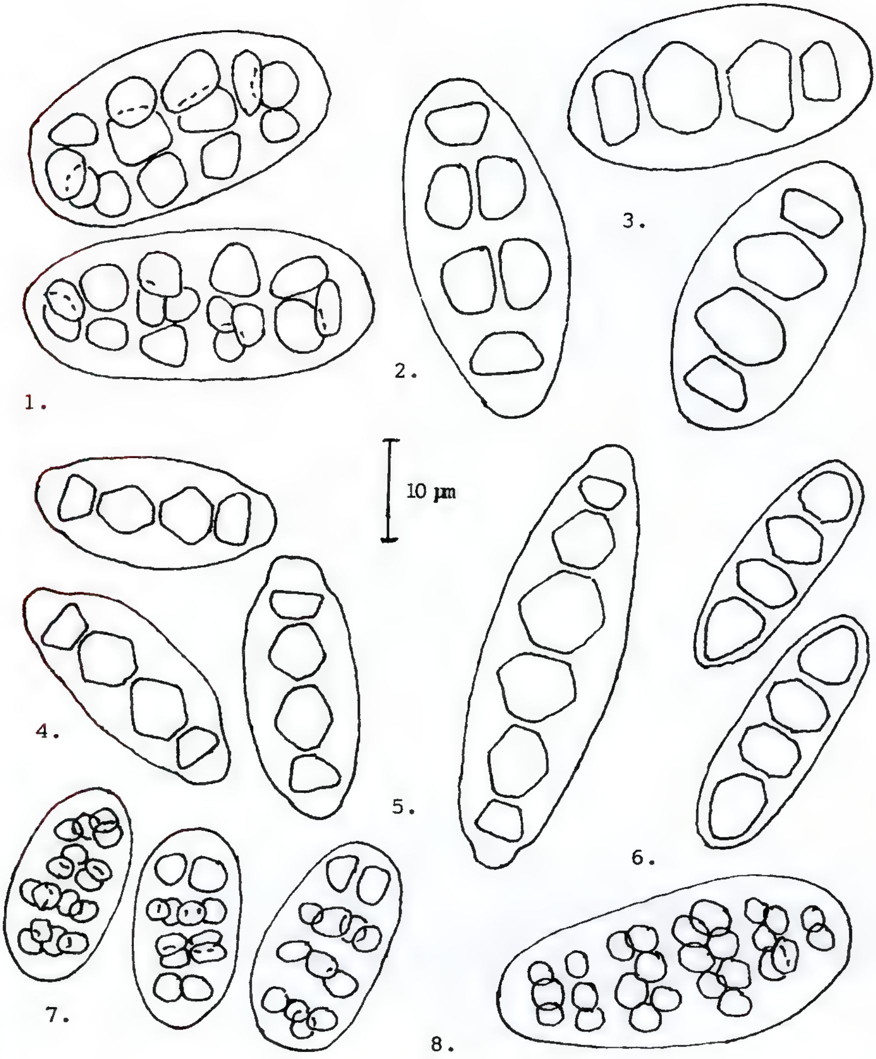

Fig. 1. *Pyrenula cruentata* (Cuba, *Wright*, Verr. Cub. 162a, isosyntype); Fig. 2. *Pyrenula cruenta* (Louisiana, *Tucker 11807*); Fig. 3. *Pyrenula cruenta* (French Guiana, *Leprieur 14*, isosyntype); Fig. 4. *Pyrenula cerina* (Florida, *Small 7565*); Fig. 5. *Pyrenula cerina* (Mexico, *Orcutt*); Fig. 6. *Trypethelium aeneum* (Florida, *Schallert*); Fig. 7. *Anthracothecium ochraceoflavum* (Amer. aequin., *Bonpland*, holotype); Fig. 8. *Anthracothecium ochraceoflavens* (West Indies, *Breutel*, holotype).

## PUBLICATION OF BRYOPHYTE/LICHEN/FUNGI/ALGAE MONOGRAPHS IN FLORA NEOTROPICA

The Organization for Flora Neotropica (OFN) aims at publishing a complete Flora of Tropical America. Since 1967 over 45 volumes have been published and many more are in preparation. Monographs published thus far deal primarily with angiosperms, some with fungi. To facilitate the publication of treatments of small neotropical groups of non-vascular cryptogams (bryophytes, lichens, fungi, algae), Flora Neotropica will begin the publication of special volumes devoted to each of these groups. Each special volume will consist of at least 100 printed pages and contain one to several taxonomic treatments. Authors may purchase reprints of their articles and will receive a complimentary copy of the entire volume.

Publication of the special volumes will be coordinated by S. Rob Gradstein (Deputy Director of Cryptogams of the OFN, Institute of Systematic Botany, University of Utrecht, P.O. Box 80.102, 3508 TC Utrecht, The Netherlands). Information about the suitability for publication in Flora Neotropica of treatments now in progress should be directed to him. Also, guidelines for publication and other specifics may be obtained through him.

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## SOCIEDAD LATINOAMERICANA DE BRIOLOGIA

Founded in April of 1983, the Sociedad Latinoamericana de Briología is an organization to promote the study of bryology in Latin America. Membership is open to all interested in Latin American bryology. The annual dues are US$10.00 and should be made payable to Silvia S. Solari, and sent to Museo Argentino de Ciencias Naturales "Bernardino Rivadavia", Av. Angel Gallardo 470, CC. 220, 1405 Buenos Aires, Argentina. Currently a newsletter, "Briolatina", is published three times a year. However, there are hopes and plans to eventually publish a regular journal.

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## I SIMPOSIO LATINOAMERICANO DE BRIOLOGIA

The I Simposio Latinoamericano de Briología will be held in Bogota, Colombia on October 18-23, 1988. Anyone who is interested in Latin American bryology can participate. The languages of the conference will be Spanish and English. The program will include sessions on systematics, ecology, floristics and phytogeography. Field trips both before and after the symposium are being organized. For additional information, please contact Jaime Aguirre C., I Simposio Latinoamerica de Briología, Apartado Aéreo 7495, Bogotá, D.E., Colombia.

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# SYNOPTIC KEYS FOR INTRODUCING STUDENTS TO LICHENS AND BRYOPHYTES

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During the past two years, I have experimented with the use of synoptic keys in teaching introductory classes in bryophytes, lichens and fungi. Synoptic keys (in either printed or electronic form) give students a better appreciation of the range of features to observe in order to identify a given genus or species. In addition, the beginner arrives at correct identifications more often: a synoptic key user is not restricted to using a particular sequence of characters such as the case for most dichotomous keys. Finally, if the user does not arrive at a clear-cut answer to an identification problem, a list of similar taxa is provided which greatly narrows the search through a list of descriptions.

I have preliminary keys to the common Pacific Northwest bryophyte genera (including 50 acrocarpous mosses, 40 pleurocarpous mosses, 24 leafy hepatics and 14 thallose hepatics), lichens (including 49 crustose species, 21 fruticose genera and 39 foliose genera and to Pacific Northwest species of *Hypogymnia* [19 species], *Cladonia* [55], *Cetraria* [17] and *Bryoria* [28]).

These keys, along with ASKATAXA (the key-running program, for IBM PCs and compatibles), information on how to run and print the keys and information about the editing program, TAXON (which is available from COMPress, P.O. Box 102, Wentworth, NH 03282) are available for downloading on TAXACOM (BUF) (see Evansia 4: 7. 1987 for instructions--heading under Computer Program section is "ASKATAXA"). Or, write to me at the above address for an MS/PC DOS-compatible floppy disk containing the above keys and files (please include $5.00 to cover costs).

Evansia 4(1) was mailed 20 April 1987.

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# OBSERVATIONS ON THE PROTONEMATA OF DRUMMONDIA PROREPENS (MUSCI: ORTHOTRICHACEAE)

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The initial development of a moss gametophyte is termed the protonema. Opinions vary on the exact definition of the protonema (see Nehira, 1983), however Fulford's (1956) definition of the protonema in leafy Hepaticae is also logical for the mosses: "the protonema includes all stages from the first division of the spore up to the formation of an apical cell with three cutting faces." This definition provides a sharp boundary for the initiation of a moss protonemaa, but since a single protonema may give rise to numerous apical cells, whose origins may be separated in time and space, no precise endpoint can be established for this phase.

Protonematal structures are morphologically simple and their forms vary not only between species but also within a single species through time. Furthermore, the cells of a single protonema are commonly polymorphic. There are, however, a number of protonematal characters which are considered stable. Nehira (1983) gives the following as basic characters of protonematal development: 1. spore coat dehiscence; 2. initial development inside or outside the spore coat (endosporic vs. exosporic development); 3. protonemal structure under normal conditions. Principally on the basis of these characters Nehira (1983) recognized fourteen moss protonematal types.

There is some controversy over the phylogenetic significance of protonematal types. Fulford (1956) and Nehira (1983) considered that, given due consideration to the effects of environmental modification, protonematal types are taxonomically significant and phylogenetically important. Schuster (1984) considers protonematal types, in an evolutionary sense, to be transitory and therefore of limited use in establishing phylogenetic linkages. The protonemata of only a few mosses have been investigated. Before one can be certain about whether or not moss protonematal types can aid in establishing phylogenetic relationships more protonemata need to be examined.

Nehira's thirteenth protonematal type is the Drummondia-type. This type has three distinctive features: endosporic protonematal development; the absence of a filamentous protonema; and leafy gametophyte formation directly on a "massive endosporous protonema." At present only Drummondia sinensis has been shown to have a Drummondia-type of protonema. Recent studies on the germination pattern and protonema of Drummondia prorepens are presented below.

## Materials and Methods

Drummondia prorepens (Hedw.) Britt. TENNESSEE, Sevier Co.: On Liriodendron and Acer in woods along Newfound Gap Road, Great Smoky Mountains National Park, Allen 2548 (CINC, PAC).

Spores were removed from mature capsules (after operculum dehiscence) and sown into 10 sterilized petri-dishes containing agar and Benecke's solution. The petri-dishes were placed in a growth chamber maintained at 21 C. The dishes were illuminated for 14 hours each day by three 20 watt fluorescent Agro-lites placed 15 cm apart and 20 cm above the dishes.

## Observations

As observed in sections made through mature capsules before the opercula are shed, the young, immature spores are embedded in a granular matrix (Fig. 1). Prior to spore germination (i.e., the first cell division of the spore after meiosis) the spores increase in size and become free from the granular matrix (Fig. 2). The first cell division of the spore takes place in the capsule and within the spore wall. Germination is therefore endosporic and precocious. At the time of their release from the capsule the endosporically developed protonemata are three-dimensional, irreglar in shape and 70-125 um in length (Figs. 3,4). The protonemata are usually totally contained within the spore wall, which is clearly marked by the deposition of endothecial debris. In a few protonemata, however, a filamentous extension could be seen penetrating the spore wall (Fig. 4).

Within two days of sowing, an evagination of some of the peripheral cells resulted in numerous breaks in the wall (Figs. 5,6). Free from the spore wall constraints, the evaginated cells developed into protonematal filaments of two types: those with long-rhomboidal cells and oblique end walls; and those with short, more or less quadrate cells and right-angled end walls (Fig. 6). These two types of filaments originated directly from the endosporic protonemata and were usually distinct from one another, but in some cases filaments with short-square cells below had long-rhomboidal cells above.

By means of anticlinal and periclinal divisions in the square-celled filaments a bulging primary, three-dimensional protonematal mass of irregular shape was formed (Figs. 7-9). At the same time anticlinal divisions at the tips of the rhomboidal-celled filaments (i.e., filamentous protonemata) resulted in their proliferation into the medium.

The occasional occurrence on the rhomboidal-celled filaments of asymmetric divisions at right angles to the oblique end walls (Fig. 11) formed a cell that in turn gave rise to a secondary mass of isodiametric cells (Figs. 12-14).

Leafy gametophytes originated at different times and in different places on the protonemata. Within 20 days of sowing the first leafy gametophytes appeared on the massive three-dimensional protonemata (Fig. 10). After 59 days leafy gametophytes appeared from the secondary mass of cells on the filamentous protonemata (Fig. 15).

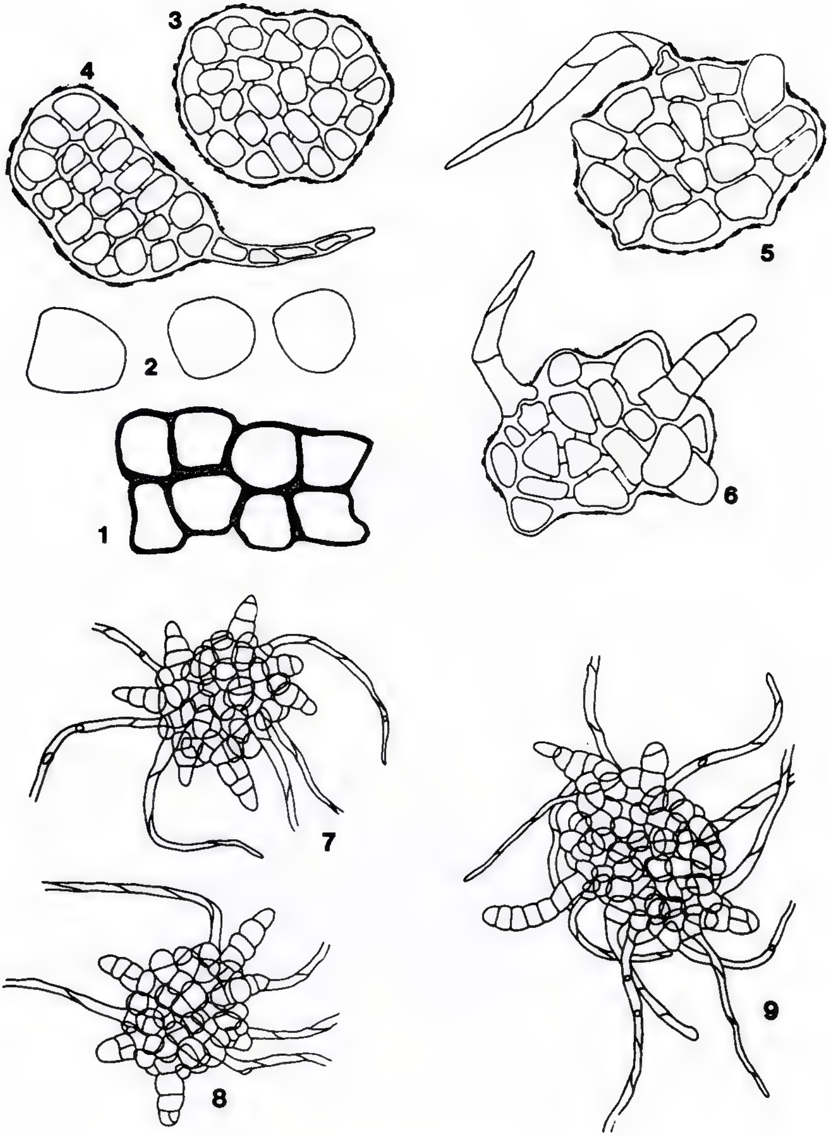
## Discussion

Conclusions drawn from observations of protonemata growing on enriched agar with high relative humidity and uniform illumination should be tempered by a consideration of the artificial nature of these conditions. These protonemata are perhaps best viewed as expressions of potential rather than strict forms found under natural conditions. Nevertheless, the protonemata of *Drummondia prorepens* are not conguent with any of the fourteen protonematal types used by Nehira (1983). Rather they combine features from several types. The formation of a massive protonema within the spore wall is found in the *Andreaea*-, *Glyphomitrium*-, and *Drummondia*-types. The formation of three-dimensional potonemata outside the ruptured spore wall is a feature of the *Encalypta*-, *Ptychomitrium*-, and *Hedwigia*-types. Two types of filamentous protonemata in association with a massive three-dimensional protonema are found in the *Encalypta*-, *Ptychomitrium*-, and *Glyphomitrium*-types.

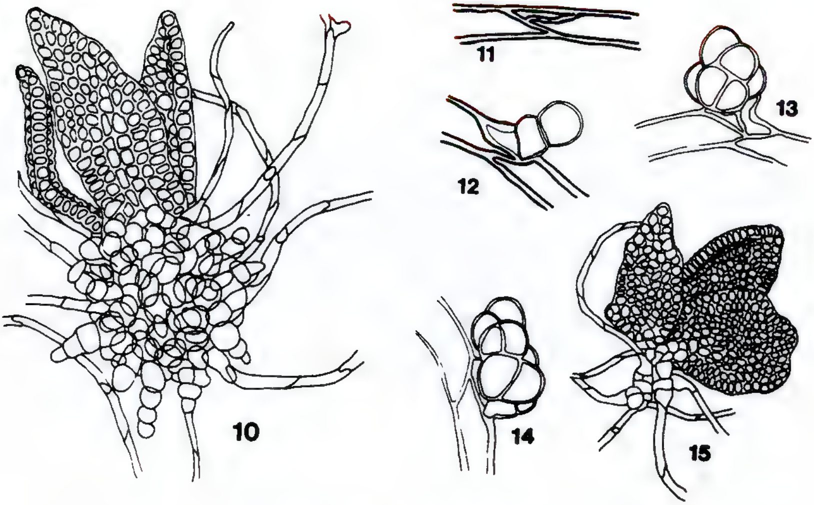
Certainly further work is needed to evaluate the usefulness of the various features found in the protonemata of mosses. Characters such as the presence or absence of different types of filamentous protonemata are likely to prove of minor value judged from the fact that these structures frequently intergrade or switch from one form to another on the same plant. On the other hand, the formation of primary, three-dimensional protonemata may be more valuable since the changes needed to form such a structure appear to be more complex.

The above observations on the protonemata of *Drummondia prorepens* seem to indicate that some of Nehira's types are not mutually exclusive. Based on these observations, the plasticity of some protonematal features, and the characteristics of Nehira's protonematal types it is possible to view Nehira's *Ptychomitrium*-, *Hedwigia*-, and *Drummondia*-types of protonemata as a single type. This type may possess dimorphic protonematal filaments, and may initiate leafy gametophytes on either primary, three-dimensional or filamentous protonemata. The salient feature of the type, however, is the ability to form a primary, three-dimensional protonema. Within this type the ability to form a massive endosporic protonema would represent a specialized condition.

Goebel (1930) has suggested that precocious, endosporic germination shortens the time of protonematal development outside the capsule. In terms of desiccation the protonema is better adapted and exposed for a shorter period of time. Conversely, Schuster (1984) considers endosporic development to be a manifestation of ecological progressions associated with the transition from soil to rock faces or tree bark. "If a taxon is specialized to cope with vertical rock faces, or vertical flanks of trees, then a spore that is released, chlorophyllose and programmed for immediate development,



Figs. 1-9, *Drummondia prorepens*. Fig. 1, immature spores embedded in a granular matrix; Fig. 2, mature spores; Figs. 3-6, endosporically developed protonemata; Figs. 7-9, primary, three-dimensional, exosporically developed protonema.



Figs. 10-15, Drummondia prorepens. Fig. 10, leafy gametophyte originating from a primary, three-dimensional protonema; Fig. 11, formation of a cell at right angles to the oblique end walls of a secondary protonematal filament; Figs. 12-14, development of a secondary mass of cells on the filamentous protonema; Fig. 15, leafy gametophyte originating from secondary mass of cells on filamentous protonema.

makes eminent sense" (Schuster, 1984). Both views stress the value of shortening the amount of time between spore germination and the formation of leafy gametophytes.

In D. prorepens leafy gametophytes are initiated on both primary, three-dimensional and filamentous protonemata. However, leafy gametophytes are initiated on the former in one-third the amount of time as those initiated on the latter. Therefore, in D. prorepens one consequence of the formation of a primary, three-dimensional protonema is the shortening of time between spore germination and leafy gametophyte formation.

I am grateful to the National Park Service for permission to collect in Great Smoky Mountains National Park, the University of Tennessee, Department of Botany for use of their park facilities and the Department of Biological Sciences, University of Cincinnati (Julie H. Wendel Summer Fellowship) for financial support.

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# THE FOURTH MIDWEST BRYOLOGICAL FORAY

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The fourth Midwest Bryological Foray was held 20-22 September 1985 in the north-central region of the Upper Peninsula of Michigan, hosted by the Department of Biology of Northern Michigan University. Glime, Bowers and Slavik (1982); Maravolo, Bowers and Freckman (1983); and McKnight and Sargent (1984), have reported on the three previous forays. The foray, organized by Maynard C. Bowers, was attended by 37 participants from Iowa, Illinois, Michigan, Wisconsin and Canada. The meeting was based at Cusino Lake Field Station, Northern Michigan University. This is a wilderness setting amid glacial-formed terrain abounding with mixed forests, lakes and streams with waterfalls, caves, limestone formations, sand dunes, interdunal forests and barren plains. Field trips were made into these areas of Alger and Schoolcraft counties. The only other bryological foray to visit any of these areas was the Sullivant Moss Society Upper Peninsula foray in 1937 (Conard, 1938).

The foray commenced on Friday afternoon with a few early arrivals who had collected along the way and around the Field Station after they had registered. Several previously unreported mosses were collected in areas adjacent to the Field Station.

The participants were treated with two very interesting talks on Friday evening. The first was a discussion by James Carter, Alger County Historical Society, of the early history of Alger and Schoolcraft counties including the people, logging and wildlife research. This early research began at the location of the current Cusino Lake Field Station which was then known as the Cusino Wildlife Research Station. The second talk was an illustrated discussion of the ecology of Pictured Rocks National Lake Shore by Walter Loope, naturalist at the Lake Shore. This park stretches from Munising to Grand Marais and encompasses a wide variety of habitats for both plants and animals.

Saturday morning began with a brief stop at the old Cusino Townsite, an area of bustling activity during the logging "heyday" of the early 1900s. One new record for Schoolcraft County was collected here.

The second stop of the morning was at Scott Falls, Alger Co., and a cave where Schistostega pennata was known to exist (Conard, 1938; Bowers, 1968). Its dazzling gold-green glitter was seen by all and small amounts of this elusive moss were collected. Because this site has been well collected, no new records were found.

Our third stop was at Tannery Falls, Alger Co. This site has been closed to the public since the time of the Sullivant Moss Society foray in 1937. A rare species of moss to be found here is Tetradontium brownianum. Its presence was confirmed by M. Bowers in late spring while previewing sites for the foray. A number of new Alger County records were found around this mossy box canyon.

A late lunch stop was made at Miners Rock in Pictured Rocks National Lake Shore, Alger Co. The rare Mielichhoferia mielichhoferiana was not recollected at this time. However, two new Alger County records were found.

Our first stop after lunch was spent at Van Meer Bog, Alger Co. This is the location where Mazzer and Sharp (1963) found Mnium andrewsianum and reported it as new to the United States. It was later identified as Mnium gracile (Bowers, 1980). Two new Alger County records were collected here.

The final stop of the day was at Driggs Lake in the sand barrens of northern Schoolcraft County. Six new county records were added from this site, including Polytrichum pallidisetum, which is also a state record.

Following this stop we returned to the Field Station for an ethnic dinner, Cornish, highlighting the pastie, and another program. Saturday evening's talks began with a discussion by John Hughes, Department of Geography, Northern Michigan University, on the geology of the local region and how this ties in with the plant distribution of the area. The second talk was an illustrated discussion by James Kessel of the Seney National Wildlife Refuge which is located a few miles south of the Field Station. This talk centered around the "how" and "why" the Refuge came into being and the current research activities being undertaken by their personnel.

After a restful night and a hearty breakfast we went again into the field to continue our search for bryophytes. Our first stop was at Sullivan Creek, Alger Co. No new records were collected here; however, elusive species seen and collected were Buxbaumia aphylla, Diphysium foliosum and Mnium drummondii.

The next site visited was the beautiful and fascinating Grand Sable Dunes and Sable Falls, Alger Co. Again we found several new records for Alger County.

Following lunch we made our final stop of the foray at a tamarack swamp in northeastern Alger County. This is an interesting area that needs more time spent in looking critically at swamp species of bryophytes. One new record was collected here.

The total of new county records from this foray are 19 for Alger County (Table 1) and 17 for Schoolcraft County (Table 2). As for state records, there was only the one from Schoolcraft County and none from Alger County. Perhaps there would have been more records if all the participants had responded with their lists of collections. Most unfortunate is the lack of lists from any of the hepaticologists. Therefore, no comment can be made concerning the liverworts.

TABLE 1
New Records for Alger County

| Taxon | Locality | Herbarium of |
|---|---|---|
| *Brachythecium plumosum* | Tannery Falls | Wm. McKnight |
| *Cirriphyllum piliferum* | Tannery Falls | Wm. McKnight |
| *Dicranum viride* | Tannery Falls | Wm. McKnight |
| *Fissidens bryoides* | Tannery Falls | Wm. McKnight |
| *Gymnostomum recurvirostrum* | Tannery Falls | Wm. McKnight |
| *Helodium blandowii* | Tannery Falls | Wm. McKnight |
| *Myurella sibirica* | Tannery Falls | Wm. McKnight |
| *Rhynchostegium serrulatum* | Tannery Falls | P. Armstrong |
| *Timmia megapolitana* | Tannery Falls | Wm. McKnight |
| *Tomenthypnum nitens* | Tannery Falls | Wm. McKnight |
| *Leucodon brachypus* var. *andrewsianus* | Miners Rock | Wm. McKnight |
| *Orthotrichum speciosum* var. *elegans* | Miners Rock | Wm. McKnight |
| *Hypnum lindbergii* | Van Meer Bog | Wm. McKnight |
| *Brachythecium reflexum* | Sable Falls & Dunes | M. Bowers |
| *Bryhnia novae-angliae* | Sable Falls & Dunes | Wm. McKnight |
| *Dicranum polysetum* | Sable Falls & Dunes | P. Armstrong |
| *Mnium cinclidioides* | Sable Falls & Dunes | M. Bowers |
| *Platygyrium repens* | Sable Falls & Dunes | Wm. McKnight |
| *Pseudoleskea radicans* | Sable Falls & Dunes | M. Bowers |

## TABLE 2
## New Records for Schoolcraft County

| Taxon | Locality | Herbarium of |
|---|---|---|
| *Amblystegium serpens* | Cusino Lake | M. Bowers |
| *Anacamptodon splachnoides* | Cusino Lake | Wm. McKnight |
| *Anomodon viticulosus* | Cusino Lake | M. Bowers |
| *Brachythecium populeum* | Cusino Lake | M. Bowers |
| *B. rutabulum* | Cusino Lake | M. Bowers |
| *Dicranum montanum* | Cusino Lake | M. Bowers |
| *D. polysetum* | Cusino Lake | Wm. McKnight |
| *Herzogiella striatella* | Cusino Lake | M. Bowers |
| *Orthotrichum sordidum* | Cusino Lake | M. Bowers |
| *Polytrichum longisetum* | Cusino Lake | M. Bowers |
| *Lindbergia brachyptera* | Cusino Townsite | M. Bowers |
| *Brachythecium reflexum* | Driggs Lake | M. Bowers |
| *B. salebrosum* | Driggs Lake | M. Bowers |
| *Hypnum curvifolium* | Driggs Lake | M. Bowers |
| *Pohlia lescuriana* | Driggs Lake | M. Bowers |
| *P. wahlenbergii* | Driggs Lake | M. Bowers |
| *Polytrichum pallidisetum* | Driggs Lake | Wm. McKnight |

Vouchers are in the collections of the various collectors. These collectors are: Illinois, Patricia Armstrong, Brian Compton, William McKnight, Robbin Moran and Malcolm Sargent; Iowa, Cynthia Botrell, Jacquie Broz, Pat Byrnes, Cindy Jounson-Groh, Diana Horton, Cynthia Kack, Curtis Klug, Gerhard Kristensson, Susan Murphy and Amy Sullivan; Michigan, Maynard Bowers, James and Kathy Bricker, Janice Glime, Michael Holman, Steve Michmerhuizen, Geert Raeymaekers, Pascale Rassat and Thomas Trana; Wisconsin, Frank Bowers, Beth Bradach, John Christy, Gordon Geeseman and Patricia Shannon; Canada, Peter Becket and wife, Douglas Boreham, Teresa de Grosbois, George and Nancy La Roi, Edward Rosen and Harry Williams.

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# DICRANUM FLAGELLARE AND FISSIDENS HALLIANUS NEW TO MISSISSIPPI

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Specimens of Dicranum flagellare Hedw. and Fissidens hallianus (Sull. & Lesq.) Mitt. were collected on 6 Oct 1987 in Mississippi, Grenada Co., in a small, seasonally dry Taxodium swamp just below the Grenada Lake dam on the Yallobusha River, a few miles east of the town of Grenada. The Dicranum (Reese 17,258) grew above the high-water line on the base of a large Taxodium in the interior of the swamp, while the Fissidens (Reese 17257) was taken from below the high-water level on the base of a small tree of Forestiera acuminata growing at the margin of the swamp. Specimens of these two species are deposited in LAF, with duplicates of the Fissidens at NY and PAC, and of the Dicranum at MICH and NY.

Both of these mosses occur in Louisiana (Reese, 1984) but neither has been reported previously from Mississippi. Dicranum flagellare is common in much of northern North America and also reaches Florida and Louisiana. Fissidens hallianus has a highly discontinuous range in the eastern United States including, in addition to the new station in Mississippi, Illinois, Ohio, Massachusetts, New Jersey, North Carolina, Florida, Louisiana and Texas (Pursell, 1987).

The moss reported here as Fissidens hallianus has previously been known in the southern United States as F. manateensis Grout, a name considered by Crum and Anderson (1981) to be synonymous with F. fontanus (B.-Pyl.) Steud. but treated as distinct by Reese (1984). It has recently been shown by Pursell (1987) that this taxon is quite different from F. fontanus and that F. hallianus is the oldest name for it.

I thank Ronald A. Pursell for confirming my identification of the specimen of Fissidens hallianus.

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# MOSSES FROM THE STATE OF MAINE—II

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This is a second contribution toward a county checklist of Maine mosses based upon referenced collections. The mosses herein reported are my collections or were found in the herbarium of the Missouri Botanical Garden. All the mosses within this list have been named or verified by me. The mosses culled from MO are referenced by collector, number and acronym. Those specimens lacking a herbarium abbreviation are deposited in the herbarium of Bruce H. Allen.

Mosses referenced by a simple collection number were collected by me. The locality information for these collections is summarized below along with the collection numbers made in those localities.

Cumberland County
1. Along the Androscoggin River at Brunswick, *Allen 5985*.
2. Orrs Island, vicinity of Gun Point Cove and Long Cove, *Allen 5991-6028*.

Knox County
1. Summit of Mt. Battie ca. 1.5 mi N of Camden, *Allen 6038*.
2. Maiden Cliff, Ridge Cliff, and Megunticook trails, along Mount Megunticook, beginning ca. 3 mi NW of Camden, ending 1.5 mi N of Camden, *Allen 6029-6036, 6039-6082*.
3. Mouth of Goose River, Rockport, *Allen 6083, 6084*.

Lincoln County
1. Spruce Point, ca. 1.5 mi SE of Boothbay Harbor, *Allen 5965-5977*.
2. Davis Island, The Eddy, Sheepacot River, ca. 1 mi SE of Wiscasset, *Allen 5987-5990*.

Waldo County
1. Moose Point, ca. 3.5 mi E of Belfast, *Allen 6085-6091*.

The nomenclature and taxonomic concepts of the species in this list follow Crum and Anderson (1981) with the exceptions of Sphagnum which follows Crum (1984) and Dicranum bonjeanii which follows Ireland (1982).

For those with an interest in Maine mosses, a referenced "working" county checklist of the mosses reported in the literature from Maine is available, on request, from the author.

Amblystegiaceae
*Amblystegium tenax* (Hedw.) C. Jens., Cumberland (5985).
*Calliergon cordifolium* (Hedw.) Kindb., Franklin (Smith s.n., MO); Penobscot (Hermann 19188, MO).
*C. giganteum* (Schimp.) Kindb., Knox (Sterki s.n., MO).
*Campylium chrysophyllum* (Brid.) J. Lange, Knox (6066)
*C. radicale* (P.-Beauv.) Grout, York (Austin, Musci Appal. 391, MO).
*Hygrohypnum montanum* (Lindb.) Broth., Oxford (Parlin s.n., MO).

Andreaeaceae
*Andreaea rothii* Web. & Mohr, Knox (6074).

Aulacomniaceae
*Aulacomnium palustre* (Hedw.) Schwaegr., Aroostook (Seymour s.n., MO); Cumberland (6017); York (Redfearn 31126, MO).

Bartramiaceae
*Bartramia pomiformis* Hedw., Franklin (Oakes 78, MO).
*Philonotis fontana* (Hedw.) Brid., Knox (6082).

Brachytheciaceae
*Bryhnia graminicolor* (Brid.) Grout, Cumberland (6006).
*Cirriphyllum piliferum* (Hedw.) Grout, Oxford (Adams s.n., MO).
*Eurhynchium riparioides* (Hedw.) Rich., Knox (6079); Piscataquis (Hermann 19193, MO).

Bryaceae
*Bryum muehlenbeckii* B.S.G., Knox (6052B).
*Pohlia nutans* (Hedw.) Lindb., Franklin (Dunham s.n., MO).

Climaciaceae
*Climacium dendroides* (Hedw.) Web. & Mohr, Somerset (Ladd 8916, MO).

Dicranaceae
*Cynodontium alpestre* (Wahl.) Milde, Cumberland (5999).
*Dicranella heteromalla* (Hedw.) Schimp., Cumberland (5992); Knox (6038); Waldo (6086); York (Redfearn 31132, MO).
*Dicranum bonjeanii* DeNot. ex Lisa, Knox (6059); York (Redfearn 31144, MO).
*D. flagellare* Hedw., Cumberland (5996); Franklin (Chamberlain s.n., MO); Washington (Merello 5, MO).
*D. fulvum* Hook., York (Redfearn 31137, MO).
*D. fuscescens* Turn., Washington (Merello 4, MO).
*D. montanum* Hedw., Knox (6058); York (Redfearn 31129a, MO).
*D. ontariense* Peterson, Cumberland (5991); Knox (6061); Oxford (Adams s.n., MO).
*D. polysetum* Sw., Cumberland (6011); Knox (6056).
*D. scoparium* Hedw., Cumberland (Wilson s.n., MO); Washington (Merello 6, MO); York (Redfearn 31128a, MO).
*D. spurium* Hedw., Cumberland (5998).
*D. undulatum* Brid., Cumberland (6015); Knox (6063).
*Oncophorus wahlenbergii* Brid., Knox (6041); Lincoln (6022).
*Paraleucobryum longifolium* (Hedw.) Loeske, Knox (6031).
*Trematodon longicollis* Michx., Oxford (Parlin s.n., MO).

Ditrichaceae
*Ceratodon purpureus* (Hedw.) Brid., Knox (6060); Penobscot (Britton 16a, MO).
*Distichium capillaceum* (Hedw.) B.S.G., Piscataquis (Porter s.n., MO); Somerset (Collins 3095B, MO).

Encalyptaceae
*Encalypta procera* Bruch, Knox (6084).

Fabroniaceae
*Anacamptodon splachnoides* (Fröl. ex Brid.) Brid., Knox (6065).

Fissidentaceae
*Fissidens bryoides* Hedw., Cumberland (6000).

Fontinalaceae
*Fontinalis antipyretica* Hedw., Knox (6030).
*F. novae-angliae* Sull., Piscataquis (Hermann 19557, MO).

Grimmiaceae
*Grimmia cribrosa* Hedw., Knox (6044).
*Racomitrium aciculare* (Hedw.) Brid., Knox (6070).
*R. heterostichum* (Hedw.) Brid. var. *heterostichum*, Knox (6052).

Hylocomiaceae

*Hylocomium splendens* (Hedw.) B.S.G., Knox (6035).

*H. umbratum* (Hedw.) B.S.G., Franklin (Dunham s.n., MO).

*Pleurozium schreberi* (Brid.) Mitt., York (Redfearn 31136, MO).

*Rhytidiadelphus triquetrus* (Hedw.) Warnst., Franklin (Dunham s.n., MO).

Hypnaceae

*Callicladium haldanianum* (Grev.) Crum, Cumberland (Wilson s.n., MO); York (Redfearn 31135, MO).

*Herzogiella striatella* (Brid.) Iwats., Cumberland (6004); Knox (6032); Washington (Merello 1, MO).

*H. turfacea* (Lindb.) Iwats., Cumberland (5997).

*Hypnum cupressiforme* Hedw., Knox (6045).

*H. imponens* Hedw., Knox (6078); Waldo (6085); York (Lisle s.n., MO).

*H. pallescens* (Hedw.) P.-Beauv., Knox (6048); Waldo (6088); York (Redfearn 31133, MO).

*H. pratense* Koch ex Spruce, Oxford (Adams s.n., MO).

*Isopterygium elegans* (Brid.) Lindb., Knox (6029); Lincoln (5988).

*Platygyrium repens* (Brid.) B.S.G., Knox (6069); Oxford (Parlin s.n., MO); Waldo (6090).

*Ptilium crista-castrensis* (Hedw.) DeNot., Aroostook (Seymour s.n., MO).

*Pylaisiella selwynii* (Kindb.) Crum, Steere & Anders., Cumberland (Wilson s.n., MO).

Leskeaceae

*Anomodon attenuatus* (Hedw.) Hüb., Franklin (Dunham s.n., MO); Knox (6046).

*A. rugelii* (C. Mull.) Keissl., Oxford (Adams s.n., MO).

*Haplohymenium triste* (Ces. ex DeNot.) Kindb., Oxford (Adams s.n., MO).

*Leskea gracilescens* Hedw., Kennebec (Grout, N. Am. Musci Perf. 43, MO).

*Leskeella nervosa* (Brid.) Loeske, Knox (6053B).

*Pterigynandrum filiforme* Hedw., Knox (6053C).

Mniaceae

*Mnium drummondii* Bruch & Schimp., Oxford (Adams s.n., MO).

*M. hornum* Hedw., York (Redfearn 31138, MO).

*M. stellare* Hedw., Oxford (Adams s.n., MO).

*M. punctatum* Hedw. var. *punctatum*, Aroostook (Seymour s.n., MO).

Neckeraceae

*Homalia trichomanoides* (Hedw.) B.S.G., Somerset (Collins 3095B, MO).

*Neckera pennata* Hedw., Cumberland (Wilson s.n., MO); Somerset (Chamberlain 3288, MO).

Orthotrichaceae

*Orthotrichum sordidum* Sull. & Lesq. ex Aust., Knox (6042).

*Ulota coarctata* (P.-Beauv.) Hamm., Knox (6081B).

*U. crispa* (Hedw.) Brid., Knox (6053D); Somerset (Ladd 8921, MO); Waldo (6089).

*U. hutchinsiae* (Sm.) Hamm., Knox (6053A).

Plagiotheciaceae

*Plagiothecium cavifolium* (Brid.) Iwats., Knox (6072).

*P. denticulatum* (Hedw.) B.S.G., Cumberland (5993B); Oxford (Parlin s.n., MO).

*P. laetum* B.S.G., Washington (Merello 2, MO).

Polytrichaceae

*Atrichum angustatum* (Brid.) B.S.G., Knox (Crockett s.n., MO).

*A. crispum* (James) Sull., Lincoln (5974).

*A. undulatum* (Hedw.) P.-Beauv.
var. *altecristatum* Ren. & Card., York (Redfearn 31139a, MO).
var. *oerstedianum* (C. Müll.) Crum, Waldo (6087).
*Polytrichum commune* Hedw. var. *commune*, Knox (6040).
*P. formosum* Hedw., Knox (6050).
*P. juniperinum* Hedw. var. *juniperinum*, Oxford (Parlin s.n., MO).
*P. pallidisetum* Funck, Washington (Merello 3, MO).
*P. piliferum* Hedw., Knox (6062); York (Redfearn 31143, MO).

Pottiaceae
*Tortella tortuosa* (Hedw.) Limpr., Knox (6083).

Schistostegaceae
*Schistostega pennata* (Hedw.) Web. & Mohr, Knox (Manley s.n., MO).

Sematophyllaceae
*Sematophyllum marylandicum* (C. Müll.) E. G. Britt., Knox (6068).

Sphagnaceae
*Sphagnum compactum* DC. ex Lam. & DC., Lincoln (5973).
*S. capillifolium* (Ehrh.) Hedw.
var. *capillifolium*, Cumberland (6016).
var. *tenellum* (Schimp.) Crum, Knox (6075).
*S. girgensohnii* Russ., Knox (6073).

Tetraphidaceae
*Tetraphis pellucida* Hedw., Aroostook (Seymour s.n., MO); Kennebec (Lewis s.n., MO); Knox (6055); York (Redfearn 31131, MO).

Thuidiaceae
*Helodium blandowii* (Web. & Mohr) Warnst., Aroostook (Collins 2692, MO); Oxford (Chamberlain s.n., MO).
*Thuidium delicatulum* (Hedw.) B.S.G., Cumberland (Wilson s.n., MO); Piscataquis (Hermann 19643, MO); York (Redfearn 31128b, MO).
*T. scitum* (P.-Beauv.) Aust., Knox (6033).

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_____ & L. E. Anderson. 1981. Mosses of Eastern North America. 2 vols., 1328 pp., 637 figs. Columbia University Press, New York
Ireland, R. R. 1982. Moss flora of the Maritime Provinces. Natl. Mus. Canada Publ. Bot. 13: 1-738.

# THE LICHEN COLLECTION OF THE CLINTON HERBARIUM, THE BUFFALO MUSEUM OF SCIENCE (BUF)

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For several years now I have been privileged to have the lichens from the Clinton Herbarium on loan in order to re-identify the New York state collections for a checklist. I wish to express my thanks to Richard Zander for making this possible. In addition to the New York material there are many historically important and interesting collections.

The lichen collection totals ca. 2750 collections, of which ca. 2600 (95%) were made before 1885 when the herbarium's founder George W. Clinton died. Of this number about one third were collected in the Buffalo area by Clinton and Mary L. Wilson, who provided the lichen section in Day's flora of the Buffalo region. This very thorough collecting provides very important baseline data on the lichen flora as it existed in the 1870s. An equally intensive survey of the present day flora would give a picture of the changes over more than one hundred years. There are some additional New York collections made by E. C. Howe (11 coll.) and C. H. Peck (41 coll.). G. W. Clinton also collected in New Jersey and Mary Wilson in Massachusetts, Michigan and New Hampshire, all in the years, 1870-1871.

The second largest block of specimens came from the herbarium of C. Leo Lesquereux (1806-1889), noted bryologist and paleobotanist. They are all from Europe antedating his emigration to the United States. Schaerer's Lichenes Helvetici constitute the bulk of them, probably complete up through fascicle 22, no. 550 (1847). Lesquereux was forced to leave Switzerland in 1848. In addition there are other collections from Schaerer's herbarium, c. 50 specimens collected by Lesquereux himself, two by Agassiz and a number with no data. I would guess that Lequereux sold the collection to Clinton when pressed for money.

The remaining third of the collection contains material from a wide variety of collectors. For eastern North America much of the material comes from the herbarium of Henry Willey (1824-1907), student and colleague of Edward Tuckerman. From the recent examination of a number of older herbaria I believe that Willey may have been more responsible for spreading lichenological knowledge in North America than Tuckerman. His material at BUF apparently constitutes a representation of North American lichens as he knew them, including some types of his and Tuckerman's species. Another significant group of specimens comes from the herbarium of J. L. Russell (1808-1873), discoverer of Hydrothyria venosa, purchased by Clinton after Russell's death. It also includes material from C. C. Frost. I have always been puzzled by the source of the epithet in the name Rinodina ascociscana (Tuck.) Tuck. My curiosity has at last been satisfied as there is a note on one of Russell's packets that it is derived from an Indian name for the White Mountains. Another major contributor of eastern lichens was C. F. Austin. As usual the specimens are without data or only indicated as coming from New Jersey. H. W. Ravenel is well represented with collections from Georgia, South Carolina and Texas, probably including some types of species described by Tuckerman. The following collectors are represented by a few collections each: J. L. Bennett (Rhode Island), J. Blake (New England, mostly Maine), J. Fowler (New Brunswick), Mary Haines (Indiana), E. Hall (Illinois), I. Lapham (Minnesota), T. Lea (Ohio), C. Mohr (SE U.S.), T. Porter (Pennsylvania), J. Torrey (Florida) and E. Tuckerman (Massachusetts).

Western lichens are more poorly represented but some interesting collectors are included. There is material from the expeditions which fixed the U.S./Canada boundary. There are 31 collections by David Lyall from the Oregon Boundary Commission, 1858-1861 and six by Eugène Bourgeau from the 1859 Palliser British North American Expedition which surveyed from Lake Superior to Alberta. There are also a few collections from J. M. Bigelow (Whipple Expediton), H. N. Bolander (California), E. Hall (Kansas, Rocky Mtns.), F. V. Hayden (Yellowstone), Miss Hodge (Colorado, Oregon) and C. Wright (Texas). Further west yet, there are 81 collections from the Hawaiian Islands by H. Mann and W. T. Brigham.

Clinton and Wilson were quite successful in getting comparative material from European lichenologists. The most interesting are 85 specimens sent by William Nylander (1822-1899): France, Fontainebleau and Paris (43), sin. loc. (9); Pyrenees (9); Algeria (3); Scandinavia (18); Finland (1); Colombia (1). Two British lichenologists sent rather large amounts of material with over 100 specimens from Reverend W. A. Leighton, mostly from England and Wales but some collected by Sir John Richardson (determined by Leighton) on the Franklin expeditions to the American Arctic. Another major contributor was Churchill Babington, also British, but the majority of the specimens come from exotic regions, many probably collected by J. D. Hooker. Babington also contributed a set of Richard Spruce's Lichenes Pyrenaei which Babington determined. There are a few other collections from the British Isles by W. Gardiner and R. K. Greville. A. F. Le Jolis (1823-1904) who wrote a lichen flora of the Cherbourg region of France, sent a set of 64 specimens from there. Henry Willey, who was an admirer and correspondent of A. Minks in Prussia, divided specimens sent by Minks and 33 are in BUF. T. W. Higginson collected seven lichens in the Azores. Scandinavia is poorly represented with a very few collections by O. G. Blomberg, A. G. Blytt and J. S. Deichmann-Branth.

There is not much material from the neotropics but a partial set of Wright's Lichenes Cubae is most noteworthy with 144 of the ca. 250 numbers present. Many of these are types of Nylander and Tuckerman species. There are 52 packets of material collected by C. T. Mohr in Mexico, mainly around Orizaba. From Russell's herbarium there are seven specimens collected by C. G. Bertero on the Juan Fernandez Islands. Additionally there is one collection from Brazil by G. Gardener and four from Guatemala by a Dr. Brown. The paleotropics fare the worst with only a few anonymous specimens from South Africa, two from Abyssinia by G. H. W. Schimper and one from Zanzibar by C. Cooke.

From the foregoing listing one can see that the lichens at BUF are important in several ways. Additional type material, especially untouched material, is always useful to monographers. The Buffalo region specimens are extremely valuable to someone like myself working on a regional flora due to the unusual thoroughness of the collecting. Finally many of the collections document the interactions among cryptogamic botanists during the 1870s, not only within the United States but also with Great Britain and France.

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